VALUE CHAIN DEVELOPMENT FOR ADDRESSING RURAL POVERTY:

ASSET BUILDING BY SMALLHOLDER COFFEE PRODUCERS AND COOPERATIVES IN NICARAGUA

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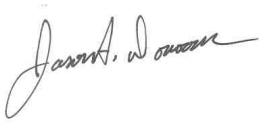

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Abstract

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Since the mid-2000s, value chain development has dominated discussions on how to reduce rural poverty through more direct and intensive engagement with the private sector. Value chain development approaches (VCDAs) aim to strengthen the linkages between poor households and one or more downstream chain actors. However, the poverty impacts of VCDAs remain an open question. This thesis presents a conceptual framework for assessing the poverty impacts of the VCDA. Poverty reduction is viewed through the lens of asset building: the greater a household's assets endowment, the greater its resilience and ability to exit from poverty, and vice versa. Given the potentially critical role played by collective enterprises in linking poor households with value chains, their economic viability and contributions to value chain development are assessed. The framework was applied to the case of Soppexcca—a fair-trade certified coffee cooperative from Nicaragua with more than 500 members. Between 2002 and 2009, Soppexcca received considerable support from NGOs to improve its linkages with buyers of certified coffee, in hopes that such linkages would provide a pathway out of poverty. The 296 sampled households, which included the membership of 11 of Soppexcca's 16 base cooperatives, provided information on changes in their asset endowments between 2005 and 2009 and the underlying reasons for the changes. Key-informant interviews and secondary sources provided data on asset building by Soppexcca over the same five-year period.

Results at the household level showed both the potential and the limitations of value chain interventions to facilitate asset building by the poor. On one hand, through their link to value chains for certified coffee, many households expanded their access to short-term and long-term credit, improved the quality of their coffee production, and reduced their vulnerability to asset erosion and food insecurity.

These results were especially important given that prior to the assessment period coffee growers in Nicaragua had experienced a prolonged period (2001–2003), during which coffee prices fell below production costs. On the other hand, many households struggled to meet their basic needs, which required them to sell their coffee outside of the value chain and limited their ability to build their asset endowments. The poorest households, which tended to depend heavily on off-farm income, were the least able to benefit from participation in the value chain. In many cases, these households struggled to purchase basic production inputs, implement good production practices for coffee, and secure title to their land.

Results at the enterprise level showed how large preexisting endowments of human and social capital provided a solid foundation for rapid asset accumulation during the assessment period. During the early period of Soppexcca development, interventions by the private sector played a critical role in building human capital, which in turn, facilitated the building of social capital. However, longer-term interventions that focused on building Soppexcca's physical and financial capitals and improving Soppexcca's service offer for its members were carried out exclusively by NGOs. NGO support allowed Soppexcca to build infrastructure for coffee processing, build its technical assistance program for quality enhancement, and expand its credit services for members. Despite major gains in assets during the assessment period, however, Soppexcca remained highly vulnerable to asset erosion from both internal and external shocks. This research highlights the need for innovation in the design of services Soppexcca provides to its members and for closer collaboration between value chain stakeholders and external service providers, such as NGOs, based on mutual learning and accountability.

This research stands out from other applications of the asset-building approach by focusing on the role of collective enterprises in value chain development and asset building at the household level, the deconstruction and specification of livelihood concepts and mechanisms, and the detailed exploration of changes in assets over time at the household level. The results suggest that if VCDAs are to contribute more effectively to poverty reduction, then changes are needed in the design of value chain interventions and the adaptation of intervention design over time. Development initiatives will require longer-term, nonlinear interventions that embrace mutual learning and risk sharing. More tailored interventions are needed that recognize the heterogeneity in households' preexisting asset base, livelihoods strategies, and vulnerability context. While the asset-building approach to assessing the poverty impacts of the VCDA presented certain limitations, overall it provided a robust framework for identifying options that facilitate participation of the asset poor in

value chains—options that most likely would not have emerged from traditional forms of impact assessment. That said, the meaningful application of the approach requires asking critical questions about the role of the vcda in building assets and a deep appreciation of the local context—questions and appreciations for which practitioners, so far, have shown limited willingness to incorporate into their assessments.

Table of Contents

Tables

Figures

Dedication

To my wife, Karina, and son, Liam,
for their support and sacrifice
during the nearly four years dedicated to this research.

To Luke, my youngest son,
who was born during the final months of this research—
may your future always shine.

To my parents, Frank and Carol Donovan,
for always encouraging me to go farther
and for supporting me unconditionally along the way.

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This research evolved out of the Ford Foundation's interest in understanding the relationship between rural poverty and value chain development. It formed part of a larger international effort sponsored by the foundation to design and validate tools for assessing the poverty impacts of value chain development approaches.

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Without the support and encouragement of Dietmar Stoian at CATIE, I would not have begun Ph.D. studies. The conceptual framework presented here evolved out of discussions with Dietmar on the relationship between value chain development and rural livelihoods. Dietmar also contributed comments and suggestions that improved various sections of this document.

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The coffee cooperative Soppexcca, its members, and the Central American office of Lutheran World Relief (LWR) invested considerable time and energy in this research. Soppexcca provided important secondary information and assistance with interpreting the research results. LWR hosted me in Nicaragua, facilitated interviews, and provided feedback on preliminary results. Hundreds of coffee-farming households graciously gave up their time to participate in data collection.

The University of London's Central Research Scholarship Fund provided funds for fieldwork in Nicaragua. These funds proved vital during the later stages of fieldwork when pressure to finish was greatest and funds were most scarce.

Finally, I owe a big thinks to Ree Sheck who corrected the various spelling and grammar mistakes that lingered in previous versions of this thesis.

1 Introduction

1.1 Smallholders and agricultural development

Success in reducing poverty on a worldwide scale has been concentrated in a few countries (e.g., those of East Asia) and, in many cases, in urban populations within those countries. Rural poverty persists in sub-Saharan Africa and significant portions of South and Southeast Asia, as well as Central and South America. Given that more than half of the development world's population lives in rural areas (World Bank 2007), rural poverty emerges as a fundamental determinant of underdevelopment. The reasons for the persistence of rural poverty are varied but are thought to include limited household asset endowments (de Janvry and Sadoulet 2000), unequal land distribution and uneven power systems (Kay 2006), limited off-farm employment opportunities, and ill-designed and poorly implemented policies (Lipton 1977). The urgency to address rural poverty could not be greater. While globalizing markets offer opportunities for marketing higher-value products that simply did not exist before, these markets generally demand considerably more in terms of business acumen, efficiency and attention to quality and food safety standards (Reardon et al. 2009) than markets for traditional products. These demands can disadvantage the small-scale farming households (World Bank 2007).

Part of the difficulty in reducing rural poverty in the developing world has been the incomplete and discontinuous nature of development strategies. During the 1950s, agriculture was considered to be a low-productivity activity and therefore not central to achieving economic growth. In this light, the rural poor contributed to growth by supplying their labour to an expanding manufacturing sector. However, experiences with industrialization generally failed to provide enough jobs for the rural poor. In the 1960s, a major revision in development thinking argued that agriculture had a central role in achieving economic growth (Johnston and Mellor 1961). The challenge facing development planners was to transform traditional agriculture into a modern sector through the poor's adoption of science-based technology (Schultz 1964). Support to agricultural development came in the form of building extension systems and local institutions to absorb improved technologies, particularly new crop varieties and practices (Mellor 1988). During this period, several countries in Latin America and Africa also implemented a variety of land reforms that aimed to facilitate the poor's participation in agricultural production. Interest in agriculture peaked during the early 1970s in the wake of the

technological achievements of the green revolution—itself a product of investments by multilateral and bilateral donors and foundations. However, by the late 1970s, interest in agriculture had waned considerably in response to a chorus of criticism about "second generation problems" of the green revolution, which included the negative effects on worsened absolute poverty, inequality of income and asset distribution, and negative effects on nutrition, women, and the environment (Griffin 1972; Harriss 1977; Mellor 1988). In many countries of Africa and Latin America, crippling deficits and inflation and the limited options for governments to address these problems through direct assistance or policy reform exacerbated these problems. Considering Africa, Mellor (1988: 59) argued that

> instead of focusing on food production and building the basic institutions for a modern agriculture over a period of decades, donors jettisoned much of what that been learned about the agricultural development experiences in Asia and in the seventies introduced new programs, such as a diffused provision of services targeted to the poor, integrated rural development, programs targeted to women, and an attack on environmental problems. These programs overlooked the critical need to address concurrently agricultural productivity and sustainability issues.

In Latin America, land reform disappeared from the policy agenda in the 1980s for political reasons and its inability to meet poverty reduction expectations (Kay 2006). During the 1990s, a period during which the neoliberal policy environment stressed limited intervention by governments in markets, overall interest in agriculture declined further, as environmental enhancement, policy reform, and democratization took precedence. While growth in smallholder agriculture could have contributed to meeting these goals, donors showed a limited appetite for major investments in the sector (Mellor 1988).

The most important change in agricultural development strategy to emerge between the late 1980s and late 1990s was the promotion of nontraditional agriculture exports (NTAEs). In the context of macroeconomic trade reforms and the expansion of free trade agreements, governments and NGOs sought to facilitate the poor's ability to participate in North-South trade in NTAEs. Multilateral and bilateral donors provided technical assistance in identifying lucrative markets and the means for meeting market requirements (e.g., technical assistance, subsidized credit, and infrastructure development). Given the dynamism of the NTAE sector (and the limited options in local markets), it was thought that a shift in the production of smallholders from staple crops to NTAE would spread the benefits of NTAE growth more widely and ensure the economic viability of smallholder production. Examples of NTAE

promotion abound in Latin America and the Caribbean, including fresh fruits and vegetables (e.g., Guatemala, Chile, Costa Rica, Honduras), fresh cut flowers (e.g., Ecuador and Colombia) and highly processed products such as frozen concentrate organic juice (e.g., Brazil, Belize). From a rural development perspective, however, various researchers criticised these programs for their perceived lack of sustainability, inattention to poverty and the environment, and negative effects on gender relations (e.g., Stonich et al. 1994; Carter, Barham, and Mesbah 1996; Donovan and Poole 2008).

By the early 2000s, agriculture had regained its footing in rural development debates. The first Millennium Development Goal of halving poverty and hunger is thought to have contributed to the renewed attention on agriculture, as the poor and hungry are more like to reside in the rural sector. The World Bank (2007) and OECD (2006) argued for renewed investments in agriculture to address poverty reduction goals, and in both cases, they recognized the diversity of stakeholders, in general, and the diversity of rural households, in particular. Some governments have also shown renewed interest in agriculture because of improved price incentives from agricultural sector reforms and higher commodity prices (World Bank 2007). In some areas, the importance of NGOs and private foundations in developing agriculture has grown to such an extent that it rivals that of governments (Byerlee, de Janvry, and Sadoulet 2009). The private sector has also become more prevalent in the rural areas of many development countries, often in the interest of improved access to raw materials and enhanced corporate social responsibility. Sharp increases in oil and food prices in 2008, and again in 2011, combined with the effects of climate change, particularly on poor farming households, have also spurred interest once again in agriculture as a way to advance poverty reduction goals.

However, doubts remain about whether smallholders, and the poor in general, can significantly benefit from reinvigorated efforts to develop agriculture. For some, smallholder agriculture is a viable option for addressing poverty reduction goals, subject to changes in the policy environment and investment patterns. Discussions along this line have focused on improved coverage and quality of financial and advisory services available to smallholders, including those provided by collective enterprises (Poulton, Dorward, and Kydd 2010), removal of existing entry barriers to lucrative nonfarm professions (Haggblade, Hazell, and Reardon 2010), and improved functioning of markets for outputs, inputs, and financial services (Hazell et al. 2010). For others, smallholder agriculture holds limited promise for addressing rural poverty. For sub-Saharan Africa, Ellis (2005) argues that any increase in agricultural output would be unable to compensate for the small and declining farm size in already

densely settled rural areas, and thus the best option for poverty reduction lies in facilitating people's mobility out of agriculture. For Latin America, Kay (2006) argues that those who encourage development processes centred on smallholder agriculture generally fail to recognize the extent to which the goals depend on the state and that the costs of development might be high and difficult to bear. "Tackling the root causes of poverty will require major land redistribution and rural investments which raise employment opportunities and improve agricultural productivity" (Kay 2006, 457).

Analysts of agricultural development and the role of smallholders agree that changes are required at various levels if agriculture is to contribute effectively to rural poverty reduction. Exactly what interventions are needed and how to implement them remains a matter of debate. The literature provides little encouragement that governments and donors are able or willing to fund large-scale, sectorwide interventions or renew discussions on agrarian reform. Researchers calling for major long-term investments in rural services and infrastructure, in particular the provision of public goods (e.g, schools, sanitation, infrastructure, extension services), are likely to receive a limited response from governments and donors in the short- to mid-term. Considerable interest does exist, however, in supporting agricultural development at the micro level—that is, among individual firms and groups of smallholders. Discussions on value chains and the potential of the private sector to participate in and contribute to rural development processes have captured the attention of policy makers and development practitioners. A clear expression of this interest is the emergence of value chain development approaches in the strategies of donors and NGOs (see Humphrey and Navas-Alemán 2010 for review).

1.2 Value chain development approaches

Value chain concepts represent an important change in thinking about development practice as it relates to the private sector and smallholder agriculture. The literature has used the term "value chain" in different ways. For researchers, it often refers to a conceptual framework for understanding the relations among independent enterprises that share responsibilities in the production of a given product or service. Here, a value chain is the set of interfirm linkages required to bring a product from production to consumption. This concept has been applied extensively for understanding the implications of globalizing markets for the poor. For development practitioners, the term has been used to describe a type of development intervention that addresses poverty through improved linkages between businesses and poor households. The term "value chain development approach" (VCDA) is thus derived from the practitioner-oriented literature. This research, however, requires a broader

definition of VCDA, one that recognizes the inputs and interests of various actors in the development of a given value chain, including those of the private sector. Use of the value chain for understanding globalization processes is explored in chapter 2. The following discussion briefly discusses ideas surrounding the VCDA. It concludes by presenting a definition of VCDA that is unique to this research.

In contrast to development approaches that focus narrowly on improving the capacities of smallholders to increase their productivity or better manage natural resources, the VCDA challenges development organizations to work with two or more stakeholders to understand the performance of the chain and identify mutually beneficial options for improving chain performance. It is reasoned that by working in closer collaboration with private sector actors, VCDA provides increased benefits to the poor and enhances options for sustainability beyond the project framework. For smallholders, benefits may include increased income, more secure market linkages, and access to new services for production. For downstream enterprises, benefits may include improved quality and flow of raw material, reduced transaction costs, and enhanced environmental and social credentials. Since the mid-2000s, various multilateral and bilateral donors, NGOs, and private foundations have embraced the VCDA (e.g., McVay and Runnekleiv 2005; SNV 2005; Kula, Downing, and Field 2006; GTZ 2007; Devaux et al. 2008; DFID 2008; USAID 2008a). VCDA interventions by NGOs may include identifying options for improved chain performance, building consensus among chain stakeholders on improvement options, provision of technical assistance, and the co-financing of infrastructure investments.

However, leadership in the design and implementation of VCDA is not limited to NGOs or government agencies. The private sector has carried out interventions for linking with smallholders in the interest of improving their access to raw material and promoting social and environmental responsibility. In other cases, the private sector carries out interventions in collaboration with development agencies. Two examples include Starbucks and the US-based NGO Conservation International, whose collaboration aims to “promote conservation and improve livelihoods in a wider range of global biodiversity hot spots” (Austin and Reavis 2004, 10) and collaboration between the US Agency for International Development and Walmart to “support small rural farmers in Central America and to connect them to the retailer’s regional and international supply chains” (USAID 2011). Interventions by the private sector may include technical assistance for quality enhancement, co-financing of investments in infrastructure, and innovations in contractual arrangements for greater risk/benefit sharing.

Discussions by researchers and development practitioners highlight three general types of interventions in support of value chain development:

- *Improved linkages between two or more firms*: Interventions are primarily concerned with reducing the risks and costs of collaboration between two or more enterprises, including trust-building initiatives, improved communication mechanisms, and institutional innovations for managing risk.
- *Improved coordination along chains*: Interventions aim to resolve bottlenecks that increase the cost of doing business along the chain, focusing on improving knowledge flows along the chain and facilitating the flow of resources along the chain (e.g., credit, inputs, or technical support).
- *Support for weakest link*: Interventions directed mainly at smallholders and their business organizations to improve their capacities to add value to primary production and otherwise comply with strict quality standards by downstream actors.

In practice, the type of VCDA implemented depends on the market context and the opportunities for achieving mutually beneficial outcomes. Improved coordination and improved commercial relations are more likely when chain participants are geographically close and share a similar cultural background. NGOs and projects are less equipped to facilitate linkages between Southern and Northern firms where issues of language, culture, and business practices differ significantly and where access to information is limited. Thus, where value chain development addresses the linkages between Southern suppliers and Northern buyers, interventions generally focus on support for the weakest link or developing new chain linkages, often involving the development of collective enterprises. Regardless of the type, value chain development interventions vary in scope: some target a selected chain and the firms and producing households attached to it while others engage various chains (and the actors in them) in a given subsector.

Not all poor households can be expected to benefit from access to chains for higher-value agricultural products. Value chain participation in more demanding markets requires smallholders to deliver consistent quality and sufficient quantity. Meeting these conditions requires a certain level of infrastructure, land, inputs, technology, knowledge, and capacities and skills, which simply may not exist among communities of asset-poor producers. Arguably, households require a minimum asset endowment in these and other areas to participate successfully in value chains. For those who fall below minimum asset thresholds, it is unclear whether public and/or private sector interventions can create the necessary preconditions for their long-term

participation in value chains. Similarly, collective enterprises and other upstream enterprises may lack certain assets to facilitate the participation of smallholders in value chains and to respond to the needs of downstream buyers and processors. Research suggests that the development of economically viable collective enterprises requires major investments by various sources over an extended period, often measured in decades (Donovan, Stoian, and Poole 2008).

This research employs an asset-based approach to explore the impacts of value chain development on rural poverty. In broad strokes, this recognizes that households struggle to build their productive assets and increase their incomes through various market linkages while at the same time trying to reduce their risk of falling deeper into poverty. Understanding value chains and VCDA in this context has not featured prominently in the value chain literature. Where poverty impacts have been discussed in the literature, they have focused narrowly on changes in income or prices for a selected product/value chain with little or no discussion of the causes of the identified changes. A review of existing information on the impacts of donor-funded value chain interventions by Humphrey and Navas-Alemán (2010) found few independent impact assessments or systematic examinations of the links between value chain interventions and poverty outcomes. Given the importance of evaluating the claims that value chains contribute to poverty reduction, the status quo—where interventions that promote value chain linkages and chain efficiencies hope or assume that the ultimate goal of reducing poverty will be an outcome—is worrisome.

A key statement that emerged from the 2007 international conference on value chain development held in Berlin (BMZ 2007) reaffirms the hope that value chain approaches reduce poverty and highlights the need for a better understanding of the poverty impacts of value chain interventions:

> The value chain approach contributes to reduction of poverty if it is employed strategically and if it concentrates on targeting poverty. We have to overcome the bias toward the better-off by consciously using the full range of options available to support the poor in value chains. This includes fostering associations, skills development and learning; facilitating contract arrangements; and supporting information and service delivery. Often it is necessary to combine value chain promotion with a livelihoods perspective, with local economic development, or with vocational training to enable the poor to enter (and stay in) commercial markets. Better monitoring tools are needed to guide value chain promotion (p. 19).

More complete analytical frameworks and better evidence are urgently needed. Without objective and meaningful poverty assessment of value chain

interventions, development actors and value chain stakeholders are limited in their ability to learn from previous interventions and improve the poverty-reducing potential of VCDAs for future interventions. The fact that discussions on value chain development have yet to juxtapose the realities/needs of rural households with the realities/needs of downstream actors in value chains presents both an opportunity and challenge for this research. The opportunity rests in expanding and deepening discussions on how VCDAs can impact the rural poor and on options for strengthening their poverty-reducing potential. The challenge lies in bringing together concepts such as poverty, rural livelihoods, and value chains, which mostly have been developed independently of each other.

Defining value chain approaches to development

For the purposes of this research, the following definition for VCDA is offered: the set of interventions by chain actors (buyers, processors, smallholders) and/or service providers (government agencies, NGOs, consultants, projects) to generate higher value added and create mutually beneficial relationships between two or more chain actors. In some cases, a chain actor leads the approach with or without support from NGOs and other types of external service providers. In other cases, service providers may play a pivotal role in establishing the conditions that enable private sector collaboration. While poverty reduction may not be an explicit goal of a given VCDA, it may be part of its measurable impact.

The concept of value added is borrowed from Porter (1980) and the supply chain management literature. It refers to the difference between the sale price of a product (which may be influenced by intangible benefits attributed to the product by consumers) and the cost of materials and outside services to produce it. Higher value added can be achieved, for example, through niche market orientation (certification), reduced production and transaction costs, and improved branding and marketing. In the value chain context, costs and benefits of higher value addition are shared between two or more actors in the chain (although in some cases, the costs may be partially subsidised by development interventions).

Chain actors invest in value chain development to improve their sourcing of raw materials and/or enhance corporate social responsibility. The livelihoods of the poor may not be a reason for investing in linkages with smallholders. In some cases, the duration of their investments may depend on the net benefits obtained, which will vary based on market conditions and the company's business strategy. Public sector actors typically invest in the interest of poverty reduction, and their interventions are likely to be time-bound. Public-sector and private-sector agents may work

independently or collaboratively (through public-private or private-private partnerships). In some cases, interventions may not pursue an explicit strategy of value chain development but do provide services that ultimately contribute to the development of a value chain. For example, a research centre may provide access to improved seeds that increase crop productivity, thus contributing to the development of the value chain as a whole. For the purposes of assessment, both types of interventions are included when defining the boundaries of a given VCDA.

1.3 Options for assessing poverty impacts

The previous discussion highlights the prominence of value chains and VCDA in recent debates on rural development while pointing out that the current dearth of information on the poverty impacts of the VCDA has negative implications for development in general. So how should we measure the impacts of VCDAs? Current efforts to assess the poverty impacts of VCDAs have yielded limited information on their strengths and limitations for achieving development goals. The limited utility of these assessments follows a general trend of ineffective design and implementation of monitoring and evaluation (M&E) for development interventions, including those in agriculture (Haddad, Lindstrom, and Pinto 2010). Discussions in the grey literature on private sector development have advocated traditional log-frame-based project assessment for understanding VCDA poverty implications (e.g., GTZ 2007; DCED 2008). While log frames and similar forms of "rigorous" assessments may serve the technocratic needs of project managers and donors, they are based on assumptions inappropriate for understanding complex development processes (Jones 2011), as they assume that the implementing organization has the capacity to achieve the outcomes and impacts on its own.

While income-based measures—the focus of most assessments related to private sector development interventions (Zandniapour, Sebstad, and Snodgrass 2004)—provide important insights into the poverty impacts of VCDAs, they are insufficient for understanding the implications of VCDAs on diversified rural livelihoods (Chambers 2006). While the use of income to define poverty has been criticised extensively in the literature (Cardoso and Helwede 1992; Reddy and Pogge 2002; Anand and Sen 2003; Laderchi et al. 2006; Townsend 2006; Helwege and Birch 2007), it continues to be used as an important indicator of success in economic growth and development programs. The Millennium Development Goal declaration, with its $1 per day poverty line, highlights the enduring nature of subsistence poverty measures in development discourse and programming. For example, in assessing the impact of donor-funded microfinance projects, the US congress passed a law in

2003 requiring that half of all the money provided by USAID to the microenterprise sector reach the very poor, defined as those earning less than US$1/day (adjusted for PPP) or those in the bottom half of those under the poverty line in their country (USAID 2008b).

While most would agree that poverty is more complex than income, there is limited agreement of how to assess multidimensional poverty. During the 1980s and early 1990s, Sen (1984, 1985) argued that discourse on poverty should move away from income to achievements or capabilities. Various scholars adopted Sen's ideas and developed them into the "capability approach" for the analysis of human well-being and the design of development interventions (e.g., Nussbaum 2000; Alkire 2002; Clark 2006; Robeyns 2005). The capability approach conceptualizes poverty as a failure to achieve basic capabilities, thus implying that development interventions should aim to expand capability. Sen's ideas have been credited with focusing attention on heterogeneity among peoples, drawing attention to group disparities (e.g., gender, race, class, caste, or age) and acknowledging that different people, cultures, and societies may have different values and aspirations (Pressman 2000; DeMartino 2001; Desai 2001; Clark 2006). However, uptake of the capability approach has been limited due to the various complications that arise when applied in the field (Sugen 1993; Comim 2001; Ysander 1993; Roemer 1996). Townsend (2006, 6) concluded that "despite the influence of Amartya Sen's contributions to development studies for two decades, his ideas on capabilities have not reached the mainstream of poverty analysis among economics and have been said to leave important gaps."

Sen's pioneering work served as a source of inspiration for discussions on sustainable livelihoods. The concept of livelihood originated as a critique of single-sector approaches that tried to solve complex rural development problems (Scoones 2009). The 1992 paper by Chambers and Conway presents the often-cited definition of livelihoods:

> A livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base. (p. 6)

The concept of sustainable livelihoods evolved to became a much-used tool for understanding poverty from a micro perspective and identifying opportunities for

development cooperation.[1] The overarching perspective shifts from groups of people obliged to undertake multiple tasks for survival to individuals rationally combining multiple activities in order to minimize risk in contexts of vulnerability. When viewed from this perspective, the fundamental issue for development becomes one of improving the capacities of the poor to engage effectively in agriculture, labour markets, and/or other opportunities while minimizing the potential trade-offs in terms of livelihood security (Deininger and Olinto 2001). This approach incorporates elements of Sen's work, namely that individuals actively shape their world within social and cultural constraints that define their capabilities and the boundaries of legitimate action (O'Laughlin 2004).

The sustainable livelihoods (SL) framework (Scoones 1998; Carney et al. 1999; Farrington et. al 1999) facilitated the application of the livelihoods thinking in development programming. It linked inputs (assets) and outputs (livelihood strategies), connected in turn to outcomes, which included income and employment as well as wider framings such as well-being and sustainability. Assets included different types of capital, for example natural, social, human, physical, and financial. It assumed that households pursued various outcomes (health, income, reduced vulnerability, etc.) by drawing on various assets to pursue a variety of activities. The activities they adopted and the way they reinvested in asset building were driven by their own preferences and priorities and their vulnerability context, including shocks (e.g., drought), overall trends (e.g., resource stocks) and seasonal variations. Opportunities were also determined by the structures (e.g., roles of government and the private sector) and processes (e.g., institutional, policy, and cultural factors). In this context, development interventions aimed to empower the poor to build upon their assets, capabilities, and activities to improve their outcomes. The framework has been criticized by many for its limited focus on issues of class and agency (Wood 2003; O'Laughlin 2004; Scoones 2009), as well as for its weak linkage between markets/value chains and a household's asset endowments, vulnerability context, and livelihoods strategy (Dorward et al. 2003).

The sustainable livelihoods framework has been described as a "method without a theory" (O'Laughlin 2004, 387). It does not ask questions about why a

[1] It was not until the late 1990s that the term "livelihoods" entered into rural development discourse in a major way—its takeoff a matter of conjecture. Scoones (2009) suggested that this was in response to increased scepticism (both popular and academic) of "Washington Consensus" and, in the case of the United Kingdom, with the arrival of a new Labour government and the publication of a white paper that committed the Department for International Development (DFID) to a poverty and livelihoods focus. However, O'Laughlin (2004, 387) observed that the micro-focus of livelihoods frameworks analysis "does not directly challenge the basic lines of macro-economic policies recommended by the IFIs. Nor are livelihoods frameworks linked to demands for major redistributive reforms. Rather they are concerned with alleviating or reducing poverty. The goal is modest—helping the poor to help themselves."

household chooses a certain strategy or what constitutes improvements in a given livelihood context. An option for addressing this limitation is to focus on assets and asset building, or the accumulation and longer-term consolidation of assets.[2] In short, the more assets possessed by a household, the more resilient it is to external shocks; the fewer assets possessed, the greater its risk of asset erosion and deeper insecurity. In fact, various authors writing in the livelihoods tradition have placed considerable emphasis on assets (e.g., Bebbington 1999; Adato and Meinzen-Dick 2007). Thus, the focus on assets provides an entry point to understanding these questions. Among the first applications of an asset framework in the context of a developing country was by Moser (1998), focusing on five asset/capital types: labour portfolio, human capital (education and training), productive (housing), household relations, and social capital (community relations). Moser (2005) described an asset-building framework that shares common concepts with the livelihoods concept, such as assets, capabilities, livelihoods, and vulnerabilities. She argued that the difference between the two is a matter of emphasis: asset-building frameworks are more specifically concerned with assets and associated asset accumulation strategies rather than more generally with livelihoods. This research employs an asset-building approach in the livelihoods tradition for understanding the poverty impacts of the VCDA.

1.4 Objectives and research questions

In his 1973 speech to the World Bank's Board of Governors in Nairobi, Robert McNamara argued, "Without rapid progress in smallholder agriculture throughout the developing world, there is little hope either of achieving long-term stable economic growth or of significantly reducing the levels of absolute poverty." Unfortunately, nearly four decades later, smallholder agriculture has yet to demonstrate its ability to provide a sustainable pathway out of poverty for many of the world's rural poor. Not long after that Nairobi speech, overall donor interest in the role of agriculture in development declined sharply. Experiences in the green revolution in the 1970s and the promotion of NTAEs in the 1980s highlighted the difficulties for development interventions to achieve scale and sustainability. The recent reprioritization of smallholder agriculture (World Bank 2007; Wiggins Kirsten, and Llambí 2010) provides an opportunity to improve the design of development interventions for increased poverty impacts over the long term.

[2] In general, the importance of building assets to reduce poverty has been recognized by economists, for example: Birdsall and Londoño 1997; Attanasio and Székely 1999; de Janvry and Sadoulet 2000; de Soto 2000; Sherraden 2000; Deere and Leon 2003; McKenzie 2003; Carter and Barrett 2004; and Adato, Carter and May 2006.

In this context, the urgency to show that value chain development can contribute to poverty reduction goals has never been greater. As noted above, value chain development has emerged as the major element of donor and NGO strategies for addressing poverty among smallholders through market-based measures. However, there is no reason to think that VCDAs provide a silver bullet for poverty reduction. After all, the micro focus on VCDA does little to address the overall debilitating context in which the poor and other value chain participants operate on a day-to-day basis. Moreover, governments and donors have shown limited willingness to invest in the longer-term, riskier interventions potentially required for successful participation in VCDA by smallholder households and resource-poor enterprises. The potential for VCDA to facilitate strong bonds for business collaboration with the poor, while making meaningful contributions to rural poverty reduction, will be greatest when smallholders are able to respond to the needs and realities of downstream chain actors, and vice versa. Understanding the ability of the poor to respond to these needs and realities has not featured prominently in discussions on value chains and value chain development. This thesis argues that new thinking is required about how to design and assess value chain interventions from a poverty-reduction perspective. In this context, the following objective was proposed:

- To gain deeper insights into the ability of resource-poor actors (smallholders and their collective enterprises) to benefit from and contribute to the development of value chains.

This objective was addressed through a case study approach that examines asset building at two levels: collective enterprise and household. The following questions guided the research:

- How do endowments of productive assets change, either positively or negatively, in response to a given VCDA at the levels of collective enterprise and household?
- What factors facilitated/constrained asset building at the collective enterprise and household levels?
- How did differences among rural households in terms of preexisting assets and livelihood strategies impact their asset building?

The case study considers multiple interventions carried out by the private sector, projects, and NGOs (see table 1) to strengthen the linkages between a fair-trade certified coffee cooperative in Nicaragua and its coffee-producing members (upstream) and buyers (downstream). The following section presents background information on the case study, including pertinent information on Nicaragua, value

chain development in response to the coffee crisis, and details on the selected cooperative and its membership base.

1.5 A case study in Nicaragua

This case study examines asset building by smallholder coffee producers in Nicaragua in response to various interventions designed to improve their linkages with value chains for certified coffee. The smallholders were affiliated with a second-tier, fair-trade certified coffee cooperative named Sociedad de Pequeños Exportadores y Compradores de Café, R.L., or Soppexcca, which collaborated with coffee buyers in Europe and bilateral donors and NGOs in the design and provision of services to its coffee-producing members. This section presents background information on Nicaragua, recent trends in international coffee markets, and the role of coffee cooperatives in Nicaragua in linking smallholders to higher-value coffee markets. The section concludes with an introduction to Soppexcca and the interventions it received for linking to value chains for certified coffee.

Background information on Nicaragua

Nicaragua is a small country, open to the world economy and highly dependent on a narrow economic base of manufacturing, agriculture, and mining. It is the second poorest country in Latin America, with an estimated gross national income per capita of US$1,000 in 2006 (World Bank 2008). Forty-six percent of the population lived below the poverty line in 2005, while 15% lived in extreme poverty.[3] In the 2010 Global Competitiveness Report issued by the World Economic Forum, Nicaragua placed 112 out of 135 countries in terms of its technological preparedness, macroeconomic environment, and state of public institutions (WEF 2010). Despite major shocks from Hurricane Mitch in 1998, a banking-sector crisis in 2001, and the collapse of coffee prices between 1999 and 2005, overall economic growth has averaged 1.7% per capita in real terms during 2001–2006 (World Bank 2008). Recent growth has accelerated, fuelled in part by growth of manufacturing exports (mainly in the textile and apparel industries) and increased coffee and beef exports.

Poverty in Nicaragua is largely rural, with 65% of the poor and 80% of the extreme poor residing in rural areas. Agriculture accounted for 28% of the total value of exports from Nicaragua in 2008, making it the second most important generator of foreign exchange, behind light manufacturing (CEPAL 2009). Among agricultural

[3] The World Bank's most recent poverty assessment of Nicaragua (World Bank 2008) estimated poverty in 2005 was the amount of income needed to purchase a basket of food and essential nonfood items at US$1.15 per day (US$413 per year). The extreme poverty line was based on the amount of income needed to purchase a bundle of food that provided 2,187 Kcal/day. This amount was US$0.61 per day (US$221 per year).

products exported by Nicaragua, coffee is the most important, accounting for 37% of the total value of agricultural exports in 2008 (ibid.). Households engaged in agriculture generally have lower education levels (93% of all household heads in this group have only a primary education or less), and gaps in agricultural productivity are large, especially by producer size and region (World Bank 2008). The use of agricultural inputs in Nicaragua is generally low: only 11% of all producers use certified seeds, 37% use chemical fertilizers, and 67% use insecticides. Lack of land title is common among agricultural producers who claim to own land. The World Bank (ibid.) estimated that 21% of all agricultural producers do not possess a title on their land.

Average coffee production in Nicaragua is 148 lbs/ha, which places it among the least productive producers of Central America, at roughly 50% the productivity of Costa Rica and 40% the productivity of Guatemala (Varangis et al. 2003). An estimated 96% of the coffee produced in Nicaragua is carried out under shade (MAGFOR 2003), which can lower the incidence of pests (Staver et al. 2001) and provide an additional source of income and subsistence. There are about 48,000 coffee farmers in Nicaragua, 80% made up of small producers with less than 3.5 ha of coffee in cultivation (Flores et al. 2002). Despite the large number of smallholders, farms larger than 3.5 ha produce more than 85% of the Nicaraguan coffee harvest due to higher intensity of management and access to purchased production inputs. In general, however, coffee producers are typically better off than the landless or those who produce basic grains and tubers mainly for subsistence. That said, the poorest of smallholder coffee farmers typically lack resources for coffee production and basic living expenses and are highly vulnerable to negative changes in output and input prices or production-related risks.

1.5.1 Recent fluctuations in international coffee markets

The recent history of coffee production in Nicaragua is marked by the coffee crisis—a period between 1999 and 2005 of dramatically low coffee prices that had negative implications for the poor in Nicaragua and in other coffee-growing regions. The average composite price[4] used by the International Coffee Organization (ICO) for coffee fell by 21% in 1999, 25% in 2000, and 29% in 2001. In late 2001, the price for coffee hit 40 cents a pound—the lowest annual ICO price since 1971 (Brown, Charveriat, and Eagleton 2001). In Central America, prices paid for green coffee did

[4] ICO composite prices, calculated by the London-based International Coffee Organization, is a weighted composite of four trading categories of coffee. Three of these are arabica (about 70% of global trade), and these include Colombian milds (15%); other milds (40%), including coffee from Central America; and Brazilian milds (20), the lowest quality arabica. The fourth major traded type of coffee is robusta (35%).

not allow coffee producers to cover their variable costs of production[5] (IADB 2002), causing immediate economic and social hardships to producers and labourers, as well as longer-term negative effects on coffee productivity due to reduced investment in coffee production. In Nicaragua, the crisis set off a chain reaction of negative events (Campos 2001; Gonzalez 2001). Tax receipts dropped, forcing local governments to scale back services and lay off workers. Coffee plantations scaled back or closed, leaving thousands of the area's most vulnerable people with reduced incomes to meet basic needs. Reports of hunger in the main coffee-growing regions of Matagalpa and Jinotega appeared in the local newspapers (e.g., Enríquez 2001). Small growers, in debt to banks and coffee processors who lent them money to care for production, were idled and faced the loss of their lands.

Analysts argued that oversupply was at the root of the coffee crisis (CEPAL 2002; Ponte 2002). After the coffee export quotas established by the International Coffee Agreement (ICA) collapsed in 1989, the regulation of coffee trade was left to each individual producer country. Almost immediately following the dissolution of the agreement, excessive quantities of coffee entered international markets, prices became volatile, and the quality of the coffee began to decline (Ponte 2002). In the early 1990s, Brazil's plantations suffered significant damage from a series of frost events that, in part, compensated for the declining quality and excess supply. However, by 1997, Brazilian producers had expanded plantings into frost-free areas and made productivity-enhancing changes in their production techniques (CEPAL 2002). Meanwhile, in Vietnam more than a million hectares of robusta coffee were planted between 1990 and 2000, enabling Vietnam to surpass Colombia as the world's second-largest coffee producer (Thanh Ha and Shively 2008). The resulting increase in export revenues provided a boost to the country's overall rural economy and led to significant declines in the incidence of poverty and hunger. However, the subsequent decline in robusta prices, by 39% in 2000 and 33% in 2001, had a domino effect on arabica prices, which were already under pressure from increased exports from Brazil.

Against this background, aggregate coffee consumption remained virtually unchanged (FAO 2003). Roasters were reluctant to increase purchases beyond their short-term need and new coffee-processing technology had improved the taste of lower-quality robusta coffee, thus reducing the need the higher-quality arabica beans

[5] In Nicaragua, production costs for traditional coffee production are estimated at US$53/qq (100-lb sack of green coffee) or US$0.53 per pound (Varangis et al. 2003). Traditional coffee production in Nicaragua takes place without the use of synthetic fertilizers and agrochemicals, where coffee is grown under a shade canopy consisting of fruit trees and banana plants. Production costs for coffee produced under "semi-technified" systems were estimated at US$58/qq, as opposed to the US$70/qq estimated for coffee produced under 'technified' systems (ibid.).

in their coffee blends. As a result, coffee roasters could market larger volumes of robusta beans in higher-end markets (Ponte 2002). The number of international coffee buyers, roasters, and distributors also become smaller during the 1990s, which was perceived to have resulted in depressed coffee prices and wider gaps between farm-gate and retail prices (Oxfam 2002, CEPAL 2002). One important demand-side trend during the period was the rapid growth of the high-quality end of the coffee market. This market includes gourmet, fair trade, organic, and ecofriendly coffees, which offer higher price premiums over traditional-coffee marketing channels and other benefits (e.g., long-term trading relationships and access to credit) (Giovannucci and Koekoek 2003; Giovannucci and Villalobos 2007) in return for higher quality and/or implementation of voluntary and private standards[6] related to production practices or the structure of marketing relationships.

Among multilateral and bilateral donors, academics, and NGOs, consensus emerged that the best response in Central America to the coffee crisis would be to develop value chains that linked smallholder coffee producers to specialty markets for coffee, including certified fair trade and organic coffee (USAID 2003; Varangis et al. 2003; IICA 2004; Bacon 2005; Kilian et al. 2005). A discussion paper prepared for a 2002 workshop on the coffee crisis in Central America (IADB/USAID/World Bank 2002, 3) argued that "the region's competitive advantage in the coffee market lies in having the adequate agro-ecological conditions to produce high quality coffees." Development strategies generally focused on 1) improving quality, facilitating certification, strengthening collective enterprises in coffee production zones where the production of high-quality coffee was most viable, and 2) promoting diversification out of coffee for regions with less potential to produce quality coffee.[7] There was hope that the private sector would also invest in the promotion of value chains for certified coffee. Importers within the specialty coffee industry put more resources into efforts to improve coffee quality and sustainability than their counterparts that sell conventional coffees in the global coffee market (Bacon et al. 2008).

[6] Voluntary standards arise from a formal coordinated process in which key participants in a market or sector seek consensus, and are usually verified through third-party auditing. Some of these are also introduced as a response to consumer requests (such as ecolabels) or as a result of civil-society initiatives (such as fair trade labelling). Private standards are developed and monitored internally by individual enterprises. What often distinguishes them from mandatory and voluntary standards is their lack of third-party verification and a lower degree of transparency and participation of affected stakeholders (e.g., preferred supply program by Starbucks).

[7] For example, in 2003, USAID implemented a multimillion-dollar program in Central America to assist smallholders improve coffee quality, form new business linkages, secure longer-term contracts with the specialty coffee industry, and identify and implement diversification options for producers who cannot be competitive (USAID 2003). In 2005, the US-based NGO Catholic Relief Services (CRS) established a Fair Trade Fund, a grant-making mechanism that disburses high-impact grants to organizations and projects that promote and expand the fair trade model (Miller 2009).

In Nicaragua, donors and NGOs invested in the promotion of value chains for certified fair trade and organically certified coffee. Interventions by donors and NGOs were critical for developing these chains, as overall involvement by the Nicaraguan government in the coffee sector had been absent since the 1980s (Pirotte, Pleyers, and Poncelet 2006). It was argued that Nicaragua had a large number of smallholders who practised low-input coffee production, many of them organized into cooperatives—thus providing an ideal starting point for organic and fair trade certification. It was also thought that through their participation in cooperatives and other forms of collective enterprises, producers would be able to obtain critical inputs (e.g., credit), at a time when few alternatives existed. In return for higher prices, smallholders were expected to increase or maintain quality control measures (usually related to harvesting and wet milling) and in some cases, implement environmentally friendly production practices. They would also have to adjust to the peculiarities of cooperatives, including relatively lengthy delays for receiving final payment for coffee. During the coffee crisis, participation in fair trade and organic markets offered producers in Nicaragua higher farm-gate prices (approximately 40% to 50% over prices offered by local intermediaries) and more secure marketing conditions (Bacon 2005).

1.5.2 Coffee cooperatives in Nicaragua

Participation in fair trade markets for coffee requires that producers belong to a cooperative or other form of collective enterprise. It is estimated that more than 10,000 coffee-producing households are members of fair-trade certified cooperatives in Nicaragua (Cafenica 2007). A substantial number of these farmers are also organically certified. Approximately 38% of the 10.7 million kg of coffee produced by the more than 9,000 members of the umbrella organization for Nicaraguan coffee cooperatives, *Cafenica*, was organically certified in 2007 (ibid.). Cooperatives sell their coffee as fair trade certified, double certified as fair trade and organic, and noncertified coffee. Cooperatives manage external relationships with buyers, NGOs, and certification agencies and manage relations with members, including the operation of an internal price structure that determines prices received at the farm gate. Cooperatives receive income from membership contribution (price paid by buyers, minus farm-gate price), provision of short-term credit services, and subsidies from NGOs and projects (especially for operation of technical services).

Nicaraguan coffee cooperatives vary in size, from a couple of hundred members to more than 2,000. Larger cooperatives are organized into two-tier structures, where base cooperatives charged with coordination between members

and the main cooperative are organized under an umbrella cooperative charged with marketing, provision of inputs and services for production, and processing. This structure attempts to make efficient use of the scarce supply of persons with leadership skills and business acumen, as well as achieve economies of scale in processing and spread the risks of international marketing. Some of the cooperatives consist of organically certified farmers only, while others include both organically certified farmers and those utilizing conventional methods. The cooperatives are democratic in the sense that the leaders are elected, their actions are approved by the membership, and meetings are held to make decisions. Larger and more established cooperatives have a professional staff for business administration and dealing with buyers and development organizations. The smaller cooperatives depend on volunteers to fill leadership positions for cooperative administration.

Since 2006, a major challenge facing coffee cooperatives in Nicaragua has been the increased level of competition with local coffee buyers for their members' coffee.[8] During the coffee crisis, when many cooperatives experienced a rapid growth in membership and prices offered by cooperatives were high relative to local traders, cooperatives faced relatively limited competition for their members' coffee. However, since 2006, prices by local traders have increased significantly, in line with the general increase in international coffee prices (fig. 1). In 2006, conventional coffee prices had surpassed the fair-trade floor price for coffee[9]. The price premium for fair-trade certified coffee was fixed at US$0.05/pound for conventional coffee and US$0.15/pound for organic coffee. From the perspective of fair trade cooperatives and the NGOs, donors, and buyers that support them, the increased competition with local intermediaries increases the risk that cooperatives fail to capture raw material despite their investments in technical assistance, credit, and training, among other services. This reasons for side-selling—the selling of coffee outside of the cooperative structure by cooperative members—and the consequences of side-selling for cooperative and value chain development has received limited attention in the cooperative or value chain development literature.

[8] Information here on the challenges faced by coffee cooperatives in Nicaragua was derived from key informant interviews with six certified coffee cooperatives in Nicaragua in 2009 (Prococer, Ucpco, Addac, Soppexcca, Cecocafen, Prodecoop).

[9] The fair trade minimum price includes a social premium, which must be used by cooperatives in developing the cooperative or coffee-growing communities by projects chosen by the members of the cooperatives. In Nicaragua, cooperatives have provided some or the entire social premium to its members in order for the cooperative to better compete with local intermediaries on the basis of price. The fair trade standards stipulate that when the market price of coffee is higher than the fair trade minimum price, the market price plus the fair trade social premium apply. Currently, the fair trade minimum price for Central American arabica is US125 cents/pound, plus US 10 cents social premium. A US 20-cent premium is added for organic certified coffee. During the past 15 years, the minimum price has increased twice, once in 2007 when the social premium was increased by US5 cents/pound and again in 2008 when the floor price was increased by US4 cents, from US 121 to 125 cents/pound.

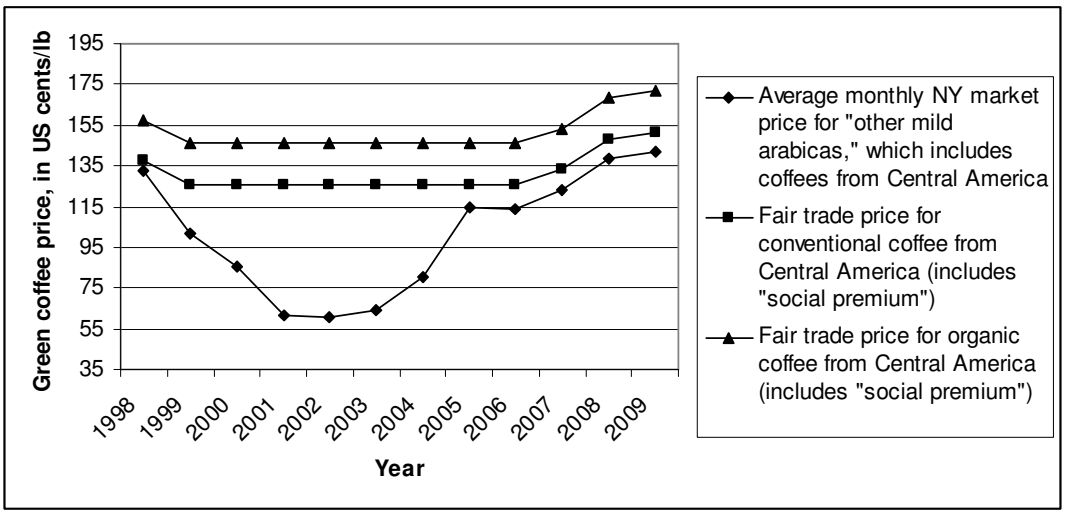

Fig. 1. Average prices (FOB) for certified and mainstream Central American arabicas, 1998–2009

Source data: FLO 2005, 2007, 2010 and International Coffee Organization 2010

1.5.3 The coffee cooperative Soppexcca

The case study presented in this research focuses on the relationships between smallholders who produced coffee, the coffee cooperative Soppexcca, and Soppexcca relationships with coffee buyers in the United States and Europe. Based in Jinotega, Nicaragua, Soppexcca is of a select group of cooperatives in Nicaragua that have received ample support from donors and NGOs for the promotion of certified fair trade and organic coffee. Soppexcca is made up of 16 base cooperatives. Each base cooperative elects two representatives who participate in the general assembly of Soppexcca, from which Soppexcca's volunteer leaders are elected (e.g., president, vice president, members of the oversight committee, members of the credit committee). In most cases, coffee-producing households formed base cooperatives during the coffee crisis for linking to Soppexcca and value chains for certified coffee. In some cases, members of a base cooperative share a similar level of asset endowments and a history of land accumulation (e.g., households organized into a base cooperative that were once part of a collective farm during the agrarian reform efforts of the 1980s). In a limited number of cases, base cooperatives facilitated wet processing of coffee; however, in general, base cooperatives do not provide services to their members (other than their linkage to Soppexcca) nor do they actively participate in decision making at Soppexcca. For this reason, base cooperatives do not form a level of analysis for this study.

Since the early 2000s, Soppexcca received extensive support from coffee buyers in Europe and from the public sector, mainly NGOs working with US and European donors. The set of these interventions is referred to as VCDA for the

purposes of this study. The remainder of this section focuses on these interventions, first addressing those from the private sector and then those from NGOs and other development organizations.

Interventions from the private sector

Critical support for Soppexcca's early development came from a small group of European coffee buyers. These buyers sought to recuperate their financial losses following the collapse of Soppexcca's predecessor cooperative, Jiprocoop.[10] In 1997, after five years of exporting fair trade coffee to European buyers, Jiprocoop declared that it would not be able to meet its contractual obligations for the delivery of green coffee. During the previous year, Jiprocoop had received US$640,000 in prefinancing from six buyers (approximately 60% of the value of the contracts).[11] However, poor oversight of the cooperative's administration permitted theft of the prefinancing by the cooperative's professional manager and the Export Committee (Denaux 2008). Without funds for prefinancing, Jiprocoop was unable to establish contracts with its members and thus unable to obtain the coffee needed to repay the prefinancing to its buyers. By 1999, Jiprocoop's debt, including interest, to its buyers had reached US$722,991. Jiprocoop was declared insolvent in 1997. According to Denaux (ibid.), default on prefinancing on such a scale was without precedent in the history of fair trade, potentially putting at risk the willingness of international buyers in fair trade markets to offer prefinancing to cooperatives.

Following the insolvency of Jiprocoop, five of the six European debt-holding coffee buyers offered a solution for repaying the debt—the organization of Soppexcca, in which the buyers would have a strong hand in operations—thus ensuring the recovery of their losses from the Jiprocoop debacle. The five coffee buyers insisted that Soppexcca organize itself as a corporation rather than a cooperative, based on their lack of confidence in cooperative governance structures to make the sacrifices required to repay the debt. The five debt-holding coffee buyers held the majority of shares in the newly formed corporation. The coffee buyer that decided not to continue collaboration with Soppexcca did so to avoid future risk exposure from coffee cooperatives (Denaux 2008). The European buyers/owners mandated that a professional manager administer the company. The manager was appointed by the Netherlands-based alternative trade organization (ATO) Max Havelaar, in coordination with the buyers/owners. The buyers/owners agreed to

[10] Jiprocoop is an acronym for Empresa Cooperativa de Productos Agropecuarios de Jinotega, R.L.

[11] Prefinancing enables cooperatives to pay producers a significant percentage of the final price when producers deliver their coffee to the cooperative. Prefinancing is provided by coffee buyers or by specialized lenders. The collateral for the loan is the contract itself. Upon receipt of the coffee in port of entry, buyers send payment, minus the prefinancing.

freeze all interest on the debt, continue to buy coffee from Soppexcca, and provide Soppexcca with prefinancing. Soppexcca and members agreed to repay the debt based on the following formula: 50% of the difference between the New York price for Nicaraguan coffee and the floor price for fair trade. Debt repayment by Soppexcca's members was divided among the buyers/owners according to the percentage of their loss. The other half of the difference between the New York and fair trade price was offered to Soppexcca members—this was critical for ensuring that Soppexcca competed effectively with local traders for members' coffee. The debt-reduction formula was agreed upon during a period when prices for certified coffee far exceeded local prices offered for noncertified coffee.

Soppexcca's initial years were marked by intense infighting among members over the purchase of green coffee, pitting members loyal to the ex-Jiprocoop manager against the new Soppexcca management. An already difficult situation was worsened by the arrival of Hurricane Mitch in October 1998, which wiped out a significant amount of that year's coffee production. Infighting and the hurricane brought Soppexcca to the brink of collapse. However, by the early 2000s, Soppexcca's viability had improved significantly in response to 1) financial and technical assistance provided the UK-based NGO Christian Aid and 2) expanded membership resulting, in part, from the interest of coffee producers in better marketing options during the coffee crisis. Under the leadership of the professional manager, Soppexcca gradually repaid its debt obligations and expanded commercial relations with coffee buyers in Europe and the United States. In 2004 Soppexcca reorganized itself as a cooperative, thus providing a legal framework for democratic decision-making processes, reducing its tax burden and increasing its options for cooperation with development organizations.

Interventions from donors and NGOs

Between 2000 and 2009, Soppexcca received support from NGOs and bilateral donors totalling approximately US$2.1 million. Other relatively large and established cooperatives participating in certified coffee markets in Nicaragua received similar levels of donor and NGO support prior to and during the coffee crisis (see Ruben and Zuniga 2010). Table 1 provides details on 12 of the larger-scale interventions received by Soppexcca during the 2000–2009 period. These interventions provided financing and technical assistance for the following:

- Infrastructure development, including the purchase of a dry mill, offices for Soppexcca and 11 of its base cooperatives, equipment for two cafés (sale of prepared coffee)

- Provision of technical assistance to members, for both conventional and organic production
- Provision of short- and long-term credit to members
- Quality and productivity enhancement, including construction of a cupping laboratory, soil and water analysis, training program for extension agents, and construction of an organic fertilizer production plant
- Addressing symptoms of poverty beyond coffee, including provision of health and educational supplies to Soppexcca members, as well as support for education and training in cooperative leadership

The considerable financial and technical support provided to Soppexcca can be rationalised in the context of the coffee crisis, the inability of the Nicaraguan government to provide services to the coffee sector, and the overall importance of coffee for achieving social and environmental goals. From the perspective of governments, donors, and NGOs, collaboration with Soppexcca allowed them to reach hundreds of relatively poor producers quickly and efficiently. Whether Soppexcca has evolved into a viable business due to the interventions and whether the donor-supported services offered by Soppexcca have contributed significantly to poverty reduction are questions explored in this thesis.

1.6 Structure of the study

This thesis contains eight chapters. The introductory chapter has outlined the research problem related to the lack of information on and understanding of the poverty impacts of VCDA. It has introduced the key questions to be addressed by this research and outlined the case study in Nicaragua. Chapter 2 explores the debates and lessons learned from the literature of nontraditional agricultural exports, value chains, certification, and collective enterprise development. Emphasis is on those factors that determined smallholder participation in higher-value markets for agricultural products. Chapter 3 presents the conceptual framework for assessing the impacts of VCDA at the enterprise level (enterprise with direct and sustained contact with smallholders) and farming household. The framework combines concepts from the livelihoods/asset-building literature and from the value chain literature to understand the internal and external forces that influence asset building by households and enterprises. Chapter 4 presents the methodology and methods for collecting and analysing data at the enterprise level (the coffee cooperative Soppexcca) and household level (coffee-producing households affiliated with Soppexcca). Chapter 5 presents the results of asset building by Soppexcca, while

Chapter 6 presents the results of asset building by Soppexcca-affiliated households. Chapter 7 synthesizes the main findings and discusses their relevance for value chain development. The final chapter presents the conclusions from the case study as well as recommendations for improving the poverty-reducing performance of interventions for the development of Soppexcca and its members in value chains for certified coffee.

Table 1 Interventions for building the assets of Soppexcca and its members to participate in value chains for certified coffee, 2000–2008

Intervention source	Period	Invested (US$)	Principal activities
Christian AID	2000–2002	25,000	Financing for credit program; training in gender equity and cooperative development
Catholic Agency for Overseas Development	2002	45,000	Financing for purchase of the land and building of office for Soppexcca
Project ACRA-Solidaridad/ European Union	2002–2005	150,000	Financing for reactivation of coffee production (long-term credit) Upgrading of wet-milling infrastructure (long-term credit for members) Operation of technical assistance program
Christian AID	2002	35,000	Financing for food relief for Soppexcca members; uniforms, school supplies
Thanksgiving Coffee/USAID	2004	15,000	Financing for construction of cupping lab Training in cupping techniques
Lutheran World Relief/ core funds, and USAID	2005–2009	500,000	Financing for technical assistance program; production diversification (goats, cocoa); equipment for cupping lab and two cafés; purchase of dry-processing plant
Development Cooperation Ireland	2005–2008	90,000	Financing for strategic plan, internal operations manual; expansion of Soppexcca office, training of baristas in coffee preparation; purchase of land for dry-processing plant
Inter-American Foundation	2004–2006	180,000	Financing for equipment for Soppexcca office; study on US specialty-coffee market; training in cupping techniques; purchase of truck for coffee transport; training in cupping techniques
Project ECODES/ European Union	2003–2005	30,000	Financing for improvements of wet-milling infrastructure for members; provision of technical assistance for coffee
Christian AID/ European Union	2007–2009	700,000	Financing for construction of 11 base co-op offices; technical assistance program; purchase of truck; plant for organic compost production; credit for construction of ecological wet mills by members; provision of technical assistance for diversification (cocoa, jams); soil/water analysis
CATIE/Norwegian Ministry of Foreign Affairs	2007–2009	35,000	Financing for value chain assessment; training in disease/pest management; cocoa production; decentralization of administration
MAGFOR-AECID/ European Union	2007–2009	250,000	Financing for technical assistance program Training in cupping and coffee drink preparation

2 Private sector development and the poor: Review of debates and experiences

2.1 Introduction

This chapter reviews the debates and experiences since the 1980s in the literature on linking the rural poor with higher value markets for agricultural products. In doing so, it aims to understand how this literature has conceptualized poverty and what lessons can be gleaned regarding the design of development interventions. The following section reviews intervention experiences in Latin America that aimed to promote nontraditional agricultural exports (NTAEs). These interventions typically involved relatively large-scale (sectorwide) efforts to develop agribusiness around the production and processing of higher value products. Various authors focused on the equity impacts of NTAE promotion and on the environmental consequences. The third section reviews discussions during the 2000s on value chains and value chain development. Particular attention is placed on the concepts of governance and upgrading. This section concludes with a summary of the implications of value chain discussions for the design of VCDA with smallholders. The fourth section discusses two important issues for the participation of smallholders in higher-value markets, namely fair trade and organic certification and collective enterprise development. Discussions on certification provide timely analysis on the impacts of certification on rural households, while discussions on rural collective enterprises provide evidence on key factors for building viable enterprises. The final section identifies key research gaps related to VCDA and rural poverty.

2.2 Lessons in export promotion from the 1980s and 1990s

In Latin America, strategies for the promotion of NTAEs for agricultural development, if not exactly for poverty reduction, were a precursor of VCDAs. During the 1980s, donors and development banks began to place serious attention on the production and marketing of NTAEs by smallholders as a means of reducing rural poverty (Barham et al. 1992; Conroy et al. 1996). Interest in export promotion in Latin America emerged partly in response to the presence of NGOs as agents for rural development. NGOs played a major role in the formulation of NTAE development strategies with the idea of capitalizing on favourable changes in the international

marketing conditions for agricultural products.[12] NTAE promotion also dovetailed with the goals of governments and development banks in the implementation of structural adjustment and market liberalization programs. Reforms in the region often included elimination of state-owned development banks; specific credit lines and minimum lending requirements to agriculture; demand-driven and co-financed investment in rural infrastructure, services, and research; and demand-driven and remunerated private extension services (David, Dirven, and Vogelgesang 2000).

2.2.1 Theoretical links between NTAEs and poverty reduction

Trade theory provides the conceptual link between NTAE exports, economic growth, and poverty reduction. In short, trade theory suggests that by following price signals of international markets and cost signals of local technologies, countries stimulate growth by specializing in products that they produce efficiently relative to the rest of the world. Specialization is expected to increase productivity and maximize income from available resources, creating an economic surplus. Countries that specialized in NTAE production would realize cost savings in production and reduce unemployment, with labour-intensive production processes absorbing surplus household labour (Moulton and Runsten 1986; de Janvry et al. 1989; de Janvry and Sadoulet 1989). Cost savings would be realized, in part, from increased use of household labour on small farms, which, it is argued, would be subject to fewer agency problems in ensuring a high-quality effort by workers and farm management (Binswanger et al. 1995). In addition to low-cost labour and relatively cheap land prices, NTAE promotion would also allow some countries in Latin America to take advantage of their geographic proximity to the United States. The benefits of economic growth from NTAEs were expected to trickle down to the rural poor through higher prices and new production and employment options and thus reduce poverty over time.

However, the poverty reduction benefits of increased NTAE promotion are not guaranteed. Trade theory is limited in explaining the export-growth link to the extent that institutional arrangements, capital endowments and risk tolerance, and public

[12] The promotion of NTAEs from Latin America was motivated, in part, by positive changes in market conditions, the implementation of various free trade agreements, and advances in ocean shipping that reduced the related costs. During the 1990s, US fruit imports rose from $2.6 billion in 1990 to $4.2 billion by 2000 (Donovan and Krissoff 2001). Much of the surge in US fruit and vegetable imports originated from Latin America, including Chile, Guatemala, the Dominican Republic, Honduras, Nicaragua, and Costa Rica. Trade agreements, such as the Caribbean Basin Initiative (CBI) and the Lomé Convention, created options for NTAEs that did not exist before. Enthusiasm for NTAE promotion continues in response to the United States-Central America-Dominican Republic Free Trade Agreement (CAFTA-DR), which was signed in 2004. As noted in a report by USAID (2008): “Failure to exploit the opportunities afforded by the treaty would make it difficult for CAFTA-DR countries to accelerate their economic growth, which has not been fast enough in most cases to achieve significant reductions in the incidence of poverty.” (p. 1)

investments in research and infrastructure play a major role in determining the ability of producers, processors, and exporters to respond to price and cost signals (Von Braun and Kennedy 1986; Braham et al. 1992; Berry 2001). In examining the Central American cattle exports between 1958 and 1979, Williams (1996) argued that key factors for the development of the cattle industry were road construction, access to US beef import quotas by processing plants, and the fact that farm households lacked official title to their land (thus allowing wealthier individuals and firms access to land by investing in government-issued land titles). Investments by the Chilean government played a crucial role in NTAE such as grapes (with publicly financed research), forest products (with government subsidies), and salmon (with investments from Fundación Chile, a quasi-public venture fund) (Rodrik 2010). Beyond the short term, comparative advantage can only be maintained to the extent that agents are able to manage the risks associated with production for export.[13]

Country-level case studies provide insight into the limitations of export promotion as a long-term rural development strategy. For example, Jenkins (1997) examined the impacts of export promotion in Bolivia. Bolivia's exports of nontraditional products grew rapidly between 1985 and 1990. Econometric analysis suggested a significant correlation between the export growth and changes in the level and stability of the real effective exchange rate but no relationship with the level of export incentives, the level of import duties, or the availability of imported inputs. Jenkins argues that improved performance from export promotion would have required a more active role of the state in supporting the development of its export sector; however, even if more resources were available, such support would have been difficult to achieve given the extremely limited capacity of the state. In Costa Rica, Hamilton and Thompson (1994) showed how, in collaboration with USAID and IMF and the World Bank, the Costa Rica government successfully expanded and diversified its agricultural exports but failed to generate the long-term conditions favourable to growth.[14] Several problems developed that limited the benefits of the

[13] Among the risks to smallholders and other agents are 1) increased dependence on market conditions for farm inputs and outputs, 2) potential crop failures and agronomic problems, 3) heightened price variability and deterioration due to increased regional competition as well as market saturation for export crops, and 4) breakdown of institutions that smallholders rely on for credit, technical assistance, and marketing of agricultural produce. For processors and exporters, there is the risk of protectionist efforts once a nontraditional export makes serious inroads into foreign markets (e.g., Barham 1992), as well as the risk of market access restriction due to food safety problems and pesticides residues (e.g., Calvin et al. 2003). See paper by Hallam et al. (2004) for discussion of risks associated with markets for NTAEs.

[14] In addition to cutting back government expenditures and reducing import tariffs, the Costa Rican government provided incentives for export-oriented investments, including tax exemptions (free trade zones) and export contracts (which provided tax exemptions, tariff reduction for imported inputs, and credit of 15% for exports having at least 35% value added in Costa Rica). USAID provided capital and technical assistance to promote NTAEs such as cocoa, fresh vegetables, cut flowers, macadamia nuts, and tropical fruits (e.g., pineapple). Nontraditional exports (both agriculture and manufactured) increased significantly during the 1980s and early 1990s, as did real GDP.

policy reforms, including: 1) excessively high incentives for exporters; 2) rapid growth of imports due to importation of production inputs and consumer goods; 3) market saturation for NTAE products (e.g., macadamia nuts); and 4) prohibitive costs of restructuring for small and medium producers.

In summary, a universal association between export expansion and growth does not exist in the literature. Exports may offer one route to rural development. As noted by Maxwell and Fernando (1989):

> Growth will be greater with a household or country that is able to sustain genuine long-term comparative advantage in a crop, when risks are kept to manageable proportions, when the crop has strong linkages to the rest of the economy, when consumption linkages are high, and when surpluses are used constructively both to hedge against uncertainty and foster growth.

Some of these conditions are crop specific or depend on conditions in the international economy, while others depend on policies related to research, pricing, taxation, and infrastructure. The ultimate outcome depends on many factors, including its starting point, the precise trade-reform measures undertaken, who the poor are, and how they sustain themselves and respond to adverse shocks and potential opportunities (Winters, McCulloch, and McKay 2004).

2.2.2 Impacts of NTAE promotion on farming households

During the late 1980s and early 1990s, numerous studies addressed the poverty implications of NTAEs at the household level. Poverty was generally considered as income poverty. Sceptics claimed that only the rich, the landed, and the foreign benefited from NTAEs. Exclusion of the poor was due to their higher-cost inputs, low risk tolerance, inability to adjust to changes in market conditions, and lack of bargaining power, among other reasons. In this view, larger producers—which could benefit from economies of scale and better access to markets and services—and multinational corporations were considered to be the primary beneficiaries of NTAE promotion. Proponents of NTAEs argued that, under appropriate conditions, and with the appropriate policy framework, the poor participated in NTAE and increased their income as a result. Poverty reduction through NTAE was a technical matter; the challenge was to select the right product, with the right producers, operating under favourable market conditions.

Among the most studied cases from Latin America is that of winter vegetables from Guatemala, with production initiated in 1972 with a loan of US$6 million by USAID to the Miami-based Latin America Agribusiness Development (LAAD) Cooperation (Murray and Hoppin 1992). These funds were followed by an additional

US$5 million loan to the U.S.-owned processing company ALCOSA in 1975. By 1980, production had spread across the highlands of Guatemala, with exports doubling in value between 1980 and 1985. USAID and the World Bank encouraged the production of winter vegetables by facilitating access to credit and providing grants.

Von Braun, Hotchkiss, and Immink (1989) analysed the impacts winter vegetable production in Guatemala, mainly snow peas, but also broccoli, cauliflower, and parsley. They collected data from members of the agricultural cooperative Cuatro Pinos on production, incomes, and nutritional attainment, comparing this data with that of a control group of nonmembers from the same village. They found that export vegetables were adopted by farmers with the least amount of land (average 0.7 ha), and incomes of the cooperative-affiliated household increased by an average of 33%. Cuatro Pinos members purchased more land than nonmembers between 1984 and 1985: 23% versus 8%, respectively. While, on average, members grew less corn on their land (50% to 60% compared with more than 80% in the control group), their corn yields were significantly higher than those of the control group.[15] The production of winter vegetables intensified labour usage in agriculture, which increased by 45% on the farms producing export vegetables. Among the smaller farms, nearly all increased labour was provided by household members. A major focus of the study by von Braun, Hotchkiss, and Immink (1989) was the impact of NTAEs on nutrition. However, they only found a slight difference between the nutritional attainment of children of cooperative members and those of the control group, despite evidence that cooperative-affiliated households were earning higher incomes and achieving higher grain yields.

Other studies confirmed the positive distributional impacts of winter vegetable production in Guatemala. Barham, Carter, and Sigelko (1995), for example, found that the rate of land accumulation by smallholder producers (less than 1 ha) was significantly more pronounced during the peak of vegetable production than prior to vegetable production. Hamilton and Fischer (2003) found that half of their sampled households had expanded their landholdings with earnings from winter vegetable production between 1983 and 2003. Moreover, of those that reported having sold “a little” of their land during the period, only 3% reported that losses from vegetable production had contributed to their decision to sell. Hamilton and Fischer (2005)

[15] Higher yields are possible by cooperative members despite the fact their maize production takes place on lower quality land. Possible explanations for these higher yields are better access to fertilizers and other agricultural inputs, the nitrogen-fixing property of snow peas, and more intensive cultivation practices essential to farming export vegetables (von Braun, Hotchkiss, and Immink 1989). These results helped address concerns over the potentially negative impact of NTAE production on food security.

report positive employment effects, with wage work in the fields providing employment for 57% of households sampled. Carter, Barham, and Mesbah (1996) attributed the broad-based growth to the following five factors: high labour requirements, 2) contractual linkages with processors (including Cuatro Pinos) that in some instances helped smallholders overcome working-capital constraints, 3) the brief gestation that makes at least two crops per season possible , 4) smallholders' ability to reduce risk by producing a mixture of basic grains and export crops, and 5) highly fragmented land distribution before the boom that insulated smallholders from direct competition with larger producers.

However, other studies shed doubt on the positive distributional impacts claimed for the winter vegetable case. Carletto, de Janvry, and Sadoulet (1999) argued that only the households with more owned land and better quality land have been able to persist in growing winter vegetable as toxicity increased, implying higher capital costs and higher risks. Of the 101 households interviewed that had produced winter vegetables for at least two years beginning in the late 1980s, 57% had stopped growing winter vegetables by 1994. The authors used statistical analysis to identify the underlying reasons for the reduction in winter vegetable production. Analysis suggested that the better-endowed households were able to persist in growing NTAEs as toxicity increased and the cooperative's ability to provide effective technical and financial services weakened, implying higher capital costs and higher risks.[16] Carletto et al. (2007) reinterviewed 296 households that were first interviewed in 1985 as part of a Cuatro Pinos study, finding that by 2005 one-quarter of the sampled households had stopped producing snow peas for at least two years (most sampled households had adopted snow pea production between 1980 and 1986).

Evidence from other countries in Latin America drew attention to the limits of NTAE production for poverty reduction when households lacked critical production inputs and were highly vulnerable to market and production fluctuations.[17] In

[16] Carletto, de Janvry, and Sadoulet. (1999) argued that the Cuatro Pinos cooperative was weakened in the early 1990s as a result of a shift in priorities by international donors away from the production and marketing of NTAEs, combined with increased default on credit that it had provided to its members: "At a time when the importance of access to credit, insurance, and information grew as a consequence of increasing capital requirements, higher risk and lower productivity of [NTAEs], the role of the cooperative as a source of liquidity, insurance, and technical assistance was much reduced, weakening its mitigating role precisely when it was most needed to overcome anti-smallholder biases." (p. 366)

[17] Reinhardt was critical of the poverty impacts of NTAE promotion in El Palmar. However, others have been more positive about the experiences. Drawing on analysis from Reinhardt (1988) and others, de Janvry et al. (1989) concludes that the El Palmar experience "illustrates the conditions that are necessary for the successful transformation from traditional to modern agricultural production on small farms and the likely effects in terms of output, income, linkages, and long-term resource depletion" (p.99). Among the conditions mentioned are 1) diffusion of a technological package suitable for land-scarce households, 2) proximity to urban markets, adequate demand, and favourable prices, 3) availability of low-cost labour, and 4) provision of credit, technical assistance, and other needed services. Thus, as was the case for Guatemala vegetables, the overall poverty reduction potential of the El Palmar experience remains an open question.

Colombia, Reinhardt (1987) examined the production of fresh tomatoes and green peppers by smallholders in the coffee-growing region of El Palmar between 1968 and 1978. Funding from the World Bank, Inter-American Development Bank, bilateral aid from Canada and counterpart government funding allowed for the provision of credit, technical assistance, and infrastructure development to support the diversification into fresh vegetable production, as well as the modernization of coffee production. Evidence from household surveys indicated that net income had increased among vegetable-adopting households. However, between 1968 and 1978, Reinhardt reported that roughly 20% of households producing tomatoes and 16% of those producing green peppers had stopped producing the products. Production problems and the extent of the necessary cash outlays accounted for the majority (75%) of those who had stopped cultivating. Producers also encountered problems of water and labour scarcity during critical stages in the cultivation of tomatoes and green peppers. Of the smallholders who continued to cultivate the vegetables, average plot size was only 0.42 ha for tomato and 0.36 ha for green pepper. This study drew attention to an issue often overlooked in the NTAE literature: strategies for income generation involving poor farm households based on a single risky crop are not likely to achieve major impacts on poverty, as they fail to take into account the diversified livelihood strategies of rural households as well as their limited asset endowments.

In Costa Rica, Mannon (2005) showed how smallholder producers of chayote were squeezed out of international markets due to a competitive and high-risk market environment. To manage risks, smallholder producers sold in local and international markets. This meant that no formal contractual linkages were made with processors and exporters. However, when faced with increasing pressure from US importers for quality, processors and exporters in Costa Rica began to bypass smallholders for large-scale producers, as they were perceived to be an unreliable source for chayote. Faced with the withdrawal of donor and government support in the early 1990s, smallholders had few options but to concentrate on local markets. When demand fell in the US market, chayote exporters stopped sourcing chayote from smallholders. Similarly, in Honduras, Stonich (1991) argued that smallholders were pushed out of shrimp farming due to shortages of postlarval and juvenile shrimp that are used to seed ponds and the resulting increased costs to import stock from other countries. Raynolds (2008) found that despite the prominence of organic cocoa and banana production in the Dominican Republic, which began in the 1980s as part of the government's efforts to promote NTAEs, rising international competition and buyers' quality expectations, combined with falling organic price premiums and relatively high production costs, pose a major threat to island's estimated 14,000 producers.

There was a general attempt in the literature to identify technical factors that would explain the participation or nonparticipation of smallholders in NTAE markets. Carter, Barham, and Mesbah (1996) reflected this tendency in their comparison of three case studies of NTAE promotion in Latin America. They argued that the short-term poverty reduction potential of NTAE promotion depended on whether small or large producers adopted the crop and, over the long term, on the patterns of structural change that shifted land between large-scale production and smallholders. In the Guatemalan vegetable case, participation of smallholders was high, but the overall proportion of land used for growing vegetables was small. In the case of grains in Paraguay, grain production favoured larger producers who absorbed relatively little labour per hectare and thus resulted in a shift of land to large farms, creating highly exclusionary growth for both producers and workers. In the case of fruit production in Chile, NTAE adoption bypassed smallholders, and over time land shifted from smallholder to larger holdings; however, it should be noted that fruit production on large-scale farms absorbs more labour than traditional crops that they displace. Among the factors working against the direct participation of the poor in the NTAE sectors in Chile and Paraguay were price-quality measurement concerns, product perishability (and resulting need for vertical integration), the extended gestation period for investments, and the absence of insurance markets.

In cases where NTAE production was dominated by large-scale agribusinesses, the poor can, in theory, benefit through increased employment opportunities (Maxwell and Fernando 1989). However, case studies from Latin America revealed mixed results. In Honduras, Stonich (1991) showed that of the 1,130 jobs provided by the 29 farms producing shrimp for export, 31% were seasonal jobs and 94% were unskilled. Most of the higher-paying jobs were held by non-Hondurans while lower ranking administrative positions were filled by people from outside the local area. In her study of the cut flower industry in Ecuador, Korovkin (2005) drew similar conclusions: “Opportunities appear more as a makeshift solution, preventing the ordinary poor from falling into the category of the extremely poor, rather than a solid basis for overcoming poverty” (p. 61). Ferm (2008) reported that women workers endured unsafe and substandard conditions in the Peruvian asparagus and the Colombian cut-flower industries, where the governments were unable to pass and enforce comprehensive labour laws and judicial procedures were weak.

However, not all assessments were negative. In Brazil Damiani (2004) found that the growth of NTAEs in Northeast Brazil was accompanied by job creation, an upgrading of labour skills, and improvements in wages and labour standards among

rural wage workers. These effects were attributed to 1) the type of crops involved and their high demand for skilled workers to meet high quality demands; 2) the limited supply of skilled workers in the region involved; 3) the consumer concerns for the labour conditions of production; 4) the characteristics of labour institutions, including laws and regulations, government agencies, and rural workers' unions; and 5) how labour institutions, crop and technology characteristics, and consumer concerns affected the balance of power between growers and rural wage workers and their respective organizations.

There is little discussion in the NTAE literature on the role of externally sourced services for upgrading the financial, business, and productive capacities of producers and other resource-poor agents, such as cooperatives and small- and medium-scale processors. In the Dominican Republic, Raynolds (2004) stressed the importance of civil society and government-provided technical assistance in the promotion of organic agriculture in the 1980s.[18] On the other hand, various studies mentioned a steep decline in smallholder participation following the withdrawal of project support in the form of credit and technical assistance (e.g., Carletto, de Janvry and Sadoulet 1999; Mannon 2005). Julian, Sullivan, and Sanchez (2000) argued that limited availability of information and producer training hindered the adoption of accepted production and postharvest technologies for the production of winter vegetables in Guatemala. In Ghana, Takane (2004) wrote that the lack of information by smallholders regarding produce specification (shape, colour, weight, sugar/acid context), limited their bargaining power with buyers.

In summary, the NTAE literature provides evidence that the rural poor, under certain conditions, could benefit from NTAE, either as producers or as labourers. For producers, evidence suggests that benefits could accrue in the short term; however, long-term benefits require greater access to vital services and a more enabling regulatory and market environment.

2.2.3 Impacts of NTAE promotion on the environment

The high use of chemical inputs often associated with NTAE production had negative implications for the environment, as well as for the farming households that produced NTAEs. Various authors highlighted how this restricted the participation of the poor in

[18] Raynolds (2005) is among the few studies in the NTAE literature to mention the positive effect of land reform on smallholder participation in NTAE production. She notes that the vast majority of small organic producers are agrarian-reform beneficiaries who have received preferential access to government services as well as to foreign assistance. Agrarian-reform producers have been required to form associations, which have proved central to facilitating organic certification, maintaining export quality and consolidating output. See Donovan Stoian and Poole (2008) for a discussion on the development trajectories of two important producer associations in the Dominican Republic, Conocado (organic cocoa) and Banelino (fair trade banana).

NTAEs. In Honduras, Murray (1991) described how the heavy pesticide use in fresh melon production generated significant ecological disruption that contributed to the demise of melon production by smallholders.[19] In the Dominican Republic, Murray and Hoppin (1992) documented how unregulated pesticide usage combined with limited capacities for alternative production systems led to the end of the production of oriental vegetables (e.g., eggplant, bitter melon, fuzzy squash) during the 1980s. Facing automatic detentions in the United States, as well increasingly high production costs due to chemical inputs, the export of oriental vegetables from the Dominican Republic essentially stopped by 1991. In Guatemala, Hoppin (1991, cited in Murray and Hoppin 1992) found that nearly all of the surveyed growers sprayed pesticides on a calendar schedule rather than when pests were identified. In addition, snow pea producers had a significantly higher risk of violating US residue standards than growers of other nontraditional crops, with producers using an average of 4.3 chemicals per season, not allowed by US regulations. Citing Morales, Pérez, and MacVean (1993), Conroy, Murray and Rosset (1996) write that soil quality had deteriorated and erosion had increased significantly in areas where winter vegetables had been produced in Guatemala.

On the other hand, evidence was also presented that smallholders adopted environmentally responsible practices when provided with the means to do so (e.g., access to effective services and affordable inputs). Among selected communities producing winter vegetables in Guatemala, Hamilton and Fischer (2003) reported gains in reducing the reliance on pesticides (especially the most toxic chemicals) and in incorporating alternative forms of pest management. Most producers reported that they practiced crop rotation, consulted with technicians before fumigation, and changed pesticides to avoid increased pest tolerance. One-third of the producers had used insect traps and one-fourth had used biological controls. However, Hamilton and Fischer reported that the producers still used an average of 17 pesticide applications in 2001. They found that producers with the most sustained access to pest-management experimentation were most likely to incorporate multiple alternative practices, including integrated pest management, to reduce the number of

[19] During the late 1980s, smallholder melon production was encouraged by large-scale exporters and USAID. By 1989, Honduras had become the leading exporter of melons to the United States. However, during the course of three tumultuous years, smallholders were largely eliminated from participation. In 1990–1991, production was nearly wiped out due to pest problems, which were attributed to lack of know-how, weather conditions, and frequent pesticide application (pest resistance and emergence of secondary pests). Citing Byrnes (1989), Murray (1991) notes that local field technicians were ill-equipped to deal with the complexities of melon pest problems, as most were trained in the production of traditional crops, such as beans and corn. With the introduction of integrated pest management for the following production year, production increased markedly; however, at harvest time prices plummeted to below production costs, forcing USAID to purchase some of the smallholders' debt from local banks. By the following year, the area farmed by smallholders had dropped by half, as smallholders abandoned production and exporters shifted away from contracts with smallholders.

applications to about seven per cycle. However, most local farmers relied on restricting the proportion of land devoted to NTAE production and crop rotation to reduce economic and environmental risks rather than decreasing substantially the use of agrochemicals. “Their notion of ‘sustainability’ appeared to be based on economically sustaining their families and caring for their land by diversifying production rather than on risking a largely nonchemical crop management strategy” (Hamilton and Fischer 2003, 95).

The policy recommendations that emerged from these discussions brought to light a quandary facing development practice: how to reduce the environmental impact of more intensive production by the poor without leaving them to pay the related costs, either through reduced productivity or through increased labour inputs. As O’Laughlin (2004, 386) asked, “How to not blame the poor for their own misery and deny to developing countries the patterns of consumption that the West enjoys?” A tentative answer would involve a mixture of enhanced technologies, improved inputs, improved financial and technical services, and subsidies for input purchases. However, some of the proposed solutions in NTAE literature left smallholders without the option of producing NTAEs or with increased production costs. Murray and Hoppin (1992) concluded: “The complex nature of the pesticide problems is a warning that more fundamental changes in US development policy may be necessary” (p. 605). They suggested that such changes might entail the incorporation of alternative pest management practices and a greater emphasis on local needs. Conroy, Murray and Rosset (1996) went a step further, advocating the promotion of organic production practices as well as a renewed focus on the production of traditional crops and food security.

2.2.4 Summary

The following lessons emerge from the discussion on NTAEs and poverty:

- Interventions that supported the participation of smallholders in NTAEs were based on the belief that participation in higher value markets would increase incomes and thus provide a pathway out of poverty. However, evidence at the household level suggests that the realities (e.g., lack of assets, vulnerability) and needs (e.g., risk mitigation) of rural households restricted their long-term participation and their ability to benefit.
- A common finding among NTAE assessments was that smallholders were able to invest initially in NTAE production but later exited in response to changes in the market context (e.g., reduced output prices, higher input prices, higher quality demands, reduced competitiveness vis-à-vis larger-

scale producers). Research highlighted the technological restrictions and disadvantages in access to inputs and services based by smallholders.

- The poverty reduction potential of NTAE interventions was generally measured in terms of income, landholdings, and equity (participation of smallholders relative to the number of medium- and large-scale producers). A more nuanced understanding of the household would provide a more effective basis for improving the poverty impacts of NTAE interventions.

2.3 Value chains and the search for upgrading opportunities

The literature on value chains focuses the ability of certain firms (usually large-scale retailers and brand-name companies) to determine the rules of the game for the other firms involved the production and marketing of a given product. One of the key findings of the value chain research was that access to developed-country markets depended on entering into the value chains of "lead firms." Research on value chains aimed to identify the terms under which firms entered the value chain and the implications for actors in the South (Gereffi 1999; Humphrey and Schmitz 2001). Several studies in value chain research from Africa painted rather bleak scenarios for the entry of resource-poor actors into value chains (e.g., Dolan and Humphrey 2000; Raikes and Gibbon 2000; Ponte 2002; Gibbon and Ponte 2005). During the mid-2000s, value chain thinking had caught the attention of development practitioners who were looking for ways to leverage the private sector in development processes. From a development perspective, the focus of value chains changed from one that identified the power of Northern firms in establishing increasingly demanding rules and preconditions for chain participation to one that searched out opportunities for the poor to upgrade in existing chains or to new chains. This section first discusses the conceptual origins of value chain research, highlighting the diversity of ideas that shaped its development. It then focuses on the two key concepts of value chain analysis: governance and upgrading. The section concludes with some thoughts on the strengths and limitations of the value chain concept for guiding rural development processes.

2.3.1 Origins of the value chain concept

The origins of value chain thinking lie in the supply chain and business strategy literature (Porter 1980) and in the work on commodity chains, which emerged out of earlier work in world-systems theory (Hopkins and Wallerstein 1994). The literature on supply chain management during the 1980s highlighted the importance of building mutually beneficial business partnerships. Porter's contribution to this literature was

the concept of a value chain within a firm and between the firm and its suppliers. He defined the value chain as a representation of a firm's value-adding activities, based on its pricing strategy and cost structure and highlighting the interdependencies of other actors in the creation of value for a single firm.

With the publication of the volume *Commodity Chains and Global Capitalism* edited by Gereffi and Korzeniewicz. (1994), the commodity chain concept evolved from a focus on world-systems[20] to a focus on the microlevel relationships between individual firms for international coordination of production and marketing (Bair 2005). Gereffi and collaborators were concerned specifically with relationships among agents in the more advanced segments of the chain (North-South nexus) and the opportunities for Southern agents to move into higher skill and higher value activities. Inspired by the export-oriented development of East Asian Tigers and the outsourcing of critical manufacturing operations by Northern firms, Gereffi and others began asking different questions about the relationship among firms at the North-South nexus. They focus on the emergence of a "new global manufacturing system," in which economic integration entails coordinated activities along the chains of given products (Raikes, Jenson, and Ponte 2000). The prime concern of commodity chain analysis was with how powerful Northern-based firms (lead firms) set up and maintain production and trade networks. Rather than trying to understand how commodity chains are structured and reproduced in a "stratified and hierarchical world-system," attention focused on the influence of lead firms and their presumed importance as potential agents of upgrading and development in the South (Gereffi 1999).

In the 2000s, the term "value chain" emerged in the development literature, incorporating elements of commodity chain analysis and Porter's value chain (see for example Kaplan and Kaplinsky 1999; Dolan and Humphrey 2000; Kaplinsky and Morris 2001; Gibbon and Ponte 2005). The conceptual underpinnings of the value chain debates appear to merge Gereffi's on commodity chains and concepts from Porter and others writing in the supply chain management literature (e.g., Giannakis, Croom, and Slack 2004; Sako 1992; Dore 1983; Heide 1993; Albers, Gehring, and Heuermann 2003). Whether the shift from commodity chains to value chains reflects

[20] World systems analysis (WSA) in the l970s challenged the assumption that the political, social, and economic environment of countries was determined by developments within those countries (Wallerstein 1974; Hopkins and Wallerstein 1994; Chase-Dunn and Crimes 1995). WSA asserted that "development" could only be understood contextually, as the outcome of local interactions with an expanding Western-centred "world economy". WSA authors attempted to go "beyond the nation-state," which had been the predominate unit of analysis in most development theories (Robinson 1998). A major tenet of WSA is the power hierarchy between core and periphery, in which a core (the North) dominated and exploited the weak periphery (the South). The peripheral countries, rather than developing along the same paths taken by core countries, were instead structurally constrained to experience developmental processes that reproduced their subordinate status. Lines of research included: bias in trading systems (e.g., Talbot 1997; Wallerstein 2002), categorisation of periphery and semi-periphery states (e.g., Mingst 1988), and analysis of core-periphery relations (e.g., Firebaugh 1992).

genuine conceptual differences is open to debate. Bair (2005) argued that they were two distinct concepts, albeit, similar concepts:

> The value chain approach focuses more on the question of how inter-firm relations are shaped by the internal logistics of sectors, such as industry structure and production-process characteristics that are more technical or organizational in nature, with less attention devoted in the value chain scheme to the external factors which shape chain dynamics and the distribution of value-added along the chain.

Despite any potential conceptual differences in the two concepts, researchers agreed in 2001 to use the term "(global) value chain" regardless of the conceptual orientation of the discussion. According to Gereffi et al. (2001), the term "(global) value chain" was chosen "because it was perceived as being the most inclusive of the full range of possible chain activities and end products." The decision to adopt the term "value chain" over "commodity chain" may also have reflected a desire to avoid misleading associations with primary agricultural products that the latter term implies.

2.3.2 Lead firms and chain governance

Chain governance refers to the coordination by "lead" firms, which are based usually in the North, of activities carried out by firms in the South. It is argued that lead firms acquire their status due to their proximity to final consumers and/or access to capital and technology. Analysis of governance dealt with the direct and indirect influence of lead firms on the organization of production, logistics, and marketing systems in the South (Humphrey and Schmitz 2005a). The governance structures created by lead firms were considered to have important consequences for the access of Southern firms to markets and the range of activities these firms can undertake (Gereffi 1999). Gereffi (1994) distinguished between two types of governance structures: buyer-driven and producer-driven, which were determined by power and barriers to entry:

- Buyer-driven: chains in which large retailers, branded marketers, and branded manufacturers established decentralized production networks. Entry barriers to the buyer node included costs of market information, product design and development, advertising, and supply management systems, some or all of which are associated with economies of scale. Sources of profits for buyers derived heavily from innovation in design, sales, marketing, and financial services rather than from production itself.
- Producer-driven: chains in which large manufacturers coordinated supplier networks. Manufacturers exerted control over backward linkages with input suppliers and forward linkages into distribution and retailing. Capital and

> proprietary know-how constituted the chief barriers to entry to the producer node. Source of profit was the combination of scale of production, technological proprietorship, and innovation.

Bair (2005) argued that the idea that chains were driven was a major conceptual advance in value chain analysis in that it captured the idea that certain types of firms dictated terms to other firms without their being any equity relation between the firms. However, Sverrisson (2003) argued that no difference existed between buyer- and producer-driven chains: both required that inputs be produced according to specifications and in the quantities ordered, and in both cases, power resided in nodes near the top of the chain. He added:

> The differences between say automobile chains (producer driven) and apparel chains (buyer driven) can equally be traced to the different lead times of products in one as against the other, the different capital requirements, and different levels of technological sophistication which prevail, and so on, rather than governance structures. Indeed, it can be argued that power is a consequence of the unequal distribution of technological capabilities and marketing skills, and/or social and spatial proximity to (relatively) wealthy consumers, etc., and not vice versa. (p. 20)

Value chain researchers focused their attention primarily on describing governance structures in buyer-driven chains (Humphrey and Schmitz 2001). Among these chains, clearly describable governance emerged where lead times are short and logistics were complicated, such as fresh fruits and vegetables, or where forward and backward linkages are extensive, such as clothing manufacture. Dolan and Humphrey (2000) detail the extensive requirements of UK supermarkets on fresh vegetable producers/exporters in Africa. Not only did supermarkets specify the type of products to be supplied (including varieties, processing, and packaging) but they also specified quality and environmental and labour requirements.[21] Where lead times are longer and logistics less complicated—as is often the case with agricultural products other than fresh fruits and vegetables—governance patterns were less easily detected. For example, in the case of coffee, Ponte (2002) asserted that buyer-driven governance was exercised by roasters in Europe and the United States through the establishment of minimum quantities needed from any particular origin to be included in a major blend. And in other cases, no clear governance pattern was

[21] Producers and exporters wishing to supply the UK market need monitoring systems that ensure compliance with retail (product quality) and legislative (due diligence) requirements. Exporters must be up-to-date on UK legislation related to pesticides, residue levels, and food safety and ensure that there are sufficient hygiene facilities and protective clothing on site. Further, they have to allocate resources to training personnel on quality and safety, as well as develop monitoring and evaluation tools to satisfy their overseas customers.

detected due to the dispersed nature of supply and demand (Cramer 1999) and the relatively low importance of quality of primary inputs on final product quality (Gibbon and Ponte 2005).

Some authors noted the limitations that the concept of governance has for understanding the impacts of increasingly globalized markets. Gellert (2003) argued that governance failed to consider the underlying conditions that gave rise to a particular of interfirm relation or that allowed it to change over time. For example, information and technology gaps, combined with limited access to critical inputs, may say as much about why Southern firms fail to break away from low-value activities as power exercised by Northern firms. In his study of the cashew sector in Mozambique, Cramer (1999) highlighted the importance of national-level political constraints on the development of agroprocessing industries (e.g., bureaucratic interference with production relations, restricted access to credit, lack of skills, and labour supply unreliability), rather than externally determined governance structures.

Some researchers cast doubt on the idea that power is unilaterally exerted by Northern firms through the establishment and enforcement of standards and passing down of low-return activities. Gereffi (1999) himself indicated doubt that buyer-driven chains are actually controlled by buyers. He noted that relatively well-endowed Southern producers of apparel sought contact with buyers of increasing sophistication, where more benefits could be obtained, leaving less lucrative niches to their less-well-endowed counterparts. As access to production inputs become increasingly limited in the North, then dependencies by Northern firms on Southern firms may develop, rather than vice versa (Pyhne and Mansilla 2003). Sverrisson (2003, p. 27) asserts: “Rather than assuming the [Northern] actors control chains and invariably get what they want, we can also surmise that rather often they learn to want what they get and to select from among the available suppliers.”

Perhaps in recognition of the limitations of the producer-buyer dichotomy, Gereffi, along with Humphrey and Sturgeon (2005), formulated a more nuanced take on chain governance that was based largely on industry structure and the characteristics of the production process. They identified five types of governance based on three factors: 1) the complexity of information and knowledge transfer required to sustain a particular transaction; 2) the extent to which this information and knowledge can be transmitted efficiently between chain actors, and 3) the capabilities of actual and potential suppliers in relation to the requirements of the transaction:

- Market: repeated market-type links characterized by low informational complexity, ease of codification of information, and high supplier capabilities

- Modular: links involving specialized suppliers who finance part of production on the part of the buyer
- Relational: links characterized by multiple interdependencies, low ability to codify information, and high supplier capabilities
- Captive: links involving one-way dependency of suppliers, high levels of supplier monitoring, and high costs of switching for suppliers, characterized by high informational complexity but low supplier capabilities
- Hierarchy: vertical integration by a single firm, characterized by complexity in production, difficulty of codification, and low supplier capabilities.

As relations move from market to hierarchy, the level of coordination increased, and with it, the power asymmetry among actors (Gereffi and Sturgeon 2004). Higher forms of governance entailed increased costs for buyers. These costs were more likely to be incurred either by the buyer or by its agents when quality and product definition are especially important and/or when the buyer is exposed to considerable risk if a given supplier fails to perform (Humphrey and Schmitz 2005b). The expanded framework recognized the complexity of transactional information and the importance of their codification for the existence of more hands-off relationships. However, among the five forms of governance listed, only three dealt with nonmarket coordination among firms. Market governance is, by its very definition, coordination based on market mechanisms, while hierarchy governance is related to coordination among units within a single firm (i.e., the absence of coordination among independent firms). The relational form seems unlikely in the case of Northern and Southern firm relations, due to large cultural, geographic, and technological differences that often exist between them. Thus, we are left with modular and captive forms of governance, which closely resemble the two forms of governance originally proposed by Gereffi (1994) of producer-driven and buyer-driven, respectively.

Several authors highlighted the role of social norms in shaping relations along the chain. Lead firms may differ in terms of strategic priorities, which influence their investment decisions and relations with suppliers (Henderson et al. 2002). Such differences may stem from the nature of ownership (equity arrangements or nationality), managerial whim, or commitment to certain values (e.g., corporate social responsibility, fair trade and organic certification). Such priorities may change over time in response to experiences acquired in the context of trading relationships, which encourage collaboration (Akerlof 1983). Gibbon and Ponte (2005) stressed the importance of overarching social norms in which chain actors operate and their implications for chain governance. They noted that the fact that clothing retailers or

coffee roasters exercised more hands-off coordination does not mean that they are less powerful in their respective chains; rather it reflected their relative success in transferring to their suppliers certain mindsets (e.g., quality control) or standardizing the production process (quality context) of goods delivered by their suppliers.

Various studies pointed to the importance of the political-legal framework in determining the ability of smallholders to access markets. Thomsen (2007) discussed how strong cultural and political connections with state agencies, rather than quality or price performance, played a critical role in determining which clothing producers in Vietnam had access to lucrative export markets. In a similar vein, Gellert (2003) described how an oligopoly of Indonesian-based timber firms came to dominate the production and export of processed tropical plywood through alliances with the state to gain control over domestic producers of the raw material and negotiated an external alliance with Japanese importers to penetrate the Japanese market. Wilkinson (2006) documented how the complex regulatory environment for captured fish, combined with entrenched interests at different segments of the value chain, limited the supermarket's involvement to the fine-tuning of logistics and the quality (freshness) of supplies.

In summary, discussions on governance highlighted the role of nonmarket focuses in shaping the relations between geographically dispersed economic actors. In general, buyers at certain links in the chain (usually in the North) play an important role in establishing the rules of the game for upstream actors. However, other forces also influence relations, including demand for raw material, the political-level environment, and business culture. From a development perspective, the key question is, How are prospects of the rural poor shaped by the terms and relations of participation? And, What opportunities exist for changing these terms? These questions are addressed in the following section.

2.3.3 Upgrading by other chain actors

According to Gereffi (1999), participation in value chains allowed upstream chain actors to acquire the skills and resources needed to upgrade by reducing costs, increasing the level of processing, or producing new types of goods or services. Thus, participation in value chains is a necessary step for upgrading because it "puts firms and economies on potentially dynamic learning curves" (ibid., 39). In this context, upgrading is primarily conceived as technological change and training that render more value adding along upstream segments of the chain. Authors typically describe four types of upgrading (Gereffi et al. 2001; Humphrey and Schmitz 2001):

- Product: production of more sophisticated products with higher unit value

- Process: more efficient transformation of outputs
- Functional: acquisition of new functions with increased skill content
- Intersectoral: application of acquired competences in a different chain

In practice, however, several complications may arise when applying the concept of upgrading. In the case of agriculture, the distinction between product and processing is unclear (e.g., organic production is both a production system and a product type). Moreover, upgrading can and does occur without any explicit coordination among lead firms and their suppliers. Sverrisson (2003, 31) questions the unilateral direction of learning (i.e., from lead firms to subordinate firms):

> There is a distinction between knowing how the product should be in order to be competitive in core markets and knowing how to make the product according to design specifications. The former skill depends on the ability to foresee trends and vogues; the other skill pertains to nuts and bolts issues such as organization, technology and commerce. In both cases, a degree of local and implicit, not to say tacit, knowledge is involved: fashion designers need to be able to interpret the lifestyles of their prospective customers, garment producers need to understand how to navigate local sources of labour and materials, and neither is likely to be of much help to each other in doing their particular share of the work.

In general, case studies examining the upgrading potential of small firms and producers in the South provide little reason for optimism. Gibbon and Ponte (2005) analysed five chains originating from sub-Saharan Africa and ending in the North (citrus, cotton, coffee, cocoa, and fresh vegetables). They concluded that where upgrading was successful, it was often preceded, or at least accompanied, by increased scale. “Although some successful upgrading to first-tier supplier positions has proved possible, this has taken place in chains where competing first-tier suppliers are relatively small in scale (fresh vegetables) or where the market structure is highly fragmented (cotton)” (ibid., 158). Dolan and Humphrey (2000) examined changes in the activities of fresh vegetable exporters in Kenya in response to structural changes in the UK retail sector. Several exporters developed relationships with importers and added increased value through freight forwarding and importing activities. These larger, more aggressive producers/exporters diversified their marketing outlets, providing year-round products to supermarket chains and increasing their sales to other regions. However, the requirements of the UK supermarkets acted as an effective barrier against small exporters and, to some extent, small producers. From Chile, Challies and Murray (2011) argued that

smallholders were able to comply with good production practice for raspberries facilitating access a higher-value international value chain; however, their adoption of such practices depended heavily on their access to effective and long-term information and guidance from extensionists.

2.3.4 Summary

- Value chain analysis brought a new perspective to thinking about the opportunities for private sector development with the poor. By focusing on the needs and requirements of different actors in the chain, it offered a systematic way to conceptualize the role of the rural poor in globalizing markets. The poor faced difficulties in accessing chains because of their limited capacities or skills and/or they faced limited benefits from chain participation due to obstacles and bottlenecks (e.g., lack of input markets, high transaction costs). The role of development interventions, therefore, was to build up the capacities of the weakest links and/or facilitate improved coordination and cooperation among chains actors.
- The concept of upgrading highlighted that participation of the poor in value chains required their ability to meet the conditions of downstream chain participants. In contrast to NTAE strategies that focused on building the supply response of a given sector, value chain analysis as applied by development practitioners focused on identifying options for improving the ability of the poor to respond to the demand of downstream chain actors. By increasing emphasis on the demand, it was argued that the private sector itself would support resource-poor enterprises and producers.
- Critiques of value chain analysis have focused mainly on the concept of governance, arguing that examples of clear governance patterns in agriculture are limited to complex chains with short lead times and that in other cases the determinants of chain participation were shaped more by supply and demand factors for key inputs and by the political-legal framework than by lead firms. That said, the concept is important in so much as it orientates attention toward demand-side factors for chain entry and the implications for Southern firms and producers.

2.4 Upgrading in chains for niche products: Certification and collective enterprise

From a poverty reduction perspective, linkages between smallholders and buyers of agricultural products in niche markets can offer rewards. By circumventing traditional, arm's length trading relationships, smallholders may access services embedded in

commercial relationships (e.g., credit, technical assistance) and add higher value to their primary production (e.g., higher quality, certification). On the other hand, new trading relationships around higher-value agricultural products often require major investments in building the capacities of smallholders and their enterprises to comply with production and logistical requirements. In the coffee and cocoa sectors, for example, value chain development interventions by NGOs frequently focused on bypassing local buyers of undifferentiated projects and linking producers with international buyers of certified or otherwise differentiated products (Linton 2008; Wollni and Zeller 2007). These markets tend to offer more stable and sometimes higher prices, driven by social and environmental consciousness and consumer concerns about quality.

Two instruments that feature prominently in discussions on value chain development in higher-value, differentiated value chains are third-party certification systems and rural collective enterprises (e.g., Rice 2001; Varangis et al. 2003; Bacon 2005; Kaplinsky 2010; Raynolds and Unathi Ngcwangu 2010). Certification systems involve specified standards, verification procedures, certifications, and often labels, thus playing a role in governing relations between actors along a value chain. Interventions by NGOs have typically focused on developing value chains under fair trade and organic certification systems. In many cases, smallholders must organize into rural collective enterprises (RCEs) for linking to value-chain certified products. These enterprises allow for increased economies of scale in processing and marketing, spreading the certification costs across a large number of growers and channeling technical assistance and other services to smallholders. Because they often attempt to manage both economic goals and social or democratic goals, they are sought out by civil society as partners in value chain development. A rich literature exists on both these topics, which is briefly reviewed in the sections below.

2.4.1 Certification systems and the rural poor

Third-party certification seeks to shape market outcomes related to producer welfare and the environment through rules governing production, organization of producers, and commercial relationships. In the food sector, fair trade and organic are the two most important third-party certification systems. The initial motivations for households in developing countries to link to value chains for certified products are usually economic (and may be backed by interest in community-level benefits related to investments in education or improved health and environmental stewardship). While the economic benefits of fair trade certification are obvious, the economic benefits for

organic certification are more nuanced, as related benefits depend on productivity, production costs, and the premium paid.

Organic agriculture became popular in the 1960s with movements that criticized the destructive nature of agroindustrial practices and created local production/distribution/consumption systems linking organic farms—distribution via food cooperatives, box schemes, and farmers' markets—and wholesome outlets (Raynolds 2004). Global organic sales are estimated at roughly US$20 billion per year and are growing at close to 20% annually in major North American and European markets (Yussefi and Willer 2003). Though organic products make up a minor share of the world food market, the proliferation of certified commodities and their increasing availability in mainstream supermarkets have made organics the fastest growing segment of the food industry (Raynolds 2004). Among developing regions, Latin America exports the broadest array of organic products. Coffee is the region's most established and widely grown organic product.

The current concept of fair trade originated in the 1960s in response to calls by NGOs and activists for greater equity in international trade based on partnership, dialogue, transparency, and respect. The concept centred on providing farmers and workers in the South with better prices, more stable markets, and resources for social and environmental projects and providing consumers in the North with product options that upheld high social and environmental standards. Various researchers conceptualize fair trade as a model for "alternative globalization" to the "neoliberal paradigm" (see Fridell 2007 for review). In other words, fair trade addresses the notion that trade liberalization has been fundamentally unfair to producers in developing countries. Fair trade is considered to provide a mechanism through which the poor overcome obstacles to marketing their products by responding to opportunities in market niches in the North (Raynolds, Murray, and Taylor 2004). With its focus on developing alternative institutions and arrangements, fair trade sidesteps the debate over whether "state-led cultivation" or "capitalist industrial agriculture" provides the best path out of poverty (Barham et al. 2010). Coffee from Mexico was the first fair trade product, and in general, coffee has been at the forefront of fair trade (FLO 2010). Since the mid-2000s, certified coffee markets in general embrace both organic and fair trade certification (e.g., 77% of organic coffee in the United States is now also fair trade certified) (Raynolds 2008).

Much of the literature of certified markets and smallholders focuses on the role of certification, in particular certification for coffee, in contributing to poverty reduction. The focus on coffee emerged out of concerns over the poverty and environmental implications of the coffee crisis—a period of historically low coffee

prices that negatively impacted coffee-growing regions around the world (see Section 1.5.1 for an overview of the coffee crisis). In Central America, for example, prices paid for green coffee did not allow coffee producers to cover their variable costs of production (IADB/USAID/World Bank 2002), causing economic and social hardships to producers and labourers, as well as longer-term negative effects on coffee productivity due to reduced investment in production. In response to the crisis, MFIs, researchers, and NGOs advocated the development of value chains that operated under fair trade and organic norms (e.g., Varangis et al. 2003; Bacon 2005). One key avenue of research has been whether certification (and corresponding civil society interventions) improved the situation of coffee producers and generated a pathway out of poverty.

The research on the impacts of certified coffee markets of smallholder coffee producers can be divided into two camps: research carried out during the height of the coffee crisis and research carried out since 2007, when coffee prices returned to (and eventually exceeded) their precrisis levels. Assessment carried out during the coffee crisis generally focused on the role of fair trade and organic certification in delivering higher producer incomes. Based on a comparison of mean coffee prices received by certified producers and noncertified producers, Bacon (2005, 506) argued that "participation in alternative coffee trade networks reduces exposure and thus vulnerability to low coffee prices." In Nicaragua, Utting (2005) observed that higher prices for fair trade coffee allowed producers to maintain their levels of nutrition and access to education and health care during the worst of the crisis but generally failed to generate major changes in living standards. In Mexico, Jaffee (2007, 260) used a sample of 51 producer households (half of which were involved in fair trade) and found higher prices for certified organic and fair-trade producers; however, his more in-depth household analysis allowed for an important critique of certification systems:

> Fair trade's guaranteed minimum price—virtually static since the movement's inception—does not fully reach producers and has lost value to inflation....The costs and exigencies of high (and rising) international organic standards are also changing traditional households' labour arrangements, communal work patterns, and producers organizations' staff requirements. These and other factors stand in the way of realizing the promise that the system provides a living wage to peasant farmers.

Various authors have challenged potential for fair trade to address rural poverty. Discussions often focused on coffee production. For example, in Mexico and Central America, Murray, Raynolds, and Taylor (2006) identified the potential for

saturation of the demand for fair trade coffee in the major importing markets, taking into account the potentially large number of producers that met fair trade criteria. Other factors were low quality, limitations for cooperatives to expand their membership, limited knowledge of fair trade by producers, and limited attention to gender fairness within cooperatives. Raynolds (2002, 24) argued that the capacity of fair trade to contribute to poverty reduction was shaped by political and economic conditions at various levels, the strength of cooperatives, and "individual characteristics of producers such as ideological commitment, educational levels, market sophistication, capital and labour resources, and environmental assets." Despite having identified high production costs and low productivity as factors limiting the poverty impacts of fair trade, Jaffee's (2007) recommendations for improving the fair trade system focused on adjustments to the framework governing relations between coffee buyers and coffee cooperatives. Perhaps the reluctance of these authors to discuss productivity issues reflected the overall concern during the coffee crisis that coffee was in excess supply. However, such concerns were shortsighted and ignored the long history of boom and bust cycles in international coffee markets (see Pendergrast 1999 for history).

During the coffee crisis, fair trade contracts provided producers with a safety net that enabled farmers to stay in their communities and work their land (Bacon 2005). But did they provide a pathway out of poverty? Discussions after the coffee crisis generally focused on the limited poverty impacts of participation in value chains for fair trade and organic certified coffee. Valkila (2009) concluded that low-intensity fair trade/organic producers tended to have higher incomes vis-à-vis their low-intensity conventional counterparts. However, in both cases productivity was too low for coffee production to provide a pathway out of poverty. Barham et al. (2010) compared net coffee income from organic and fair-trade certified farming households with net coffee income from noncertified farming households. They found that net income per hectare was higher for certified farming households but that the difference in yields, rather than price, accounted for the difference. They went on to suggest that "improving the welfare of coffee growing households through better technology and management deserved more attention, especially in developing countries where public extension services have been curtailed or eliminated in recent decades" (ibid., 142). Wilson (2010) highlighted the limited ability of poor farming households to accumulate assets through participation in value chains for certified coffee:

> The flexibility of the peasant households to mend and patch together a disarticulated capitalist market by stretching out their resources, self-exploiting

and self-provisioning, enables them to continue producing coffee for the fair trade market even when it is unprofitable. (p. 91)

A common research finding that emerged following the coffee crisis was the limited ability of poor farming households to invest in coffee production, despite the higher prices often offered by fair trade contracts. Wood (2003) argued that the poor in general are obliged to forgo productive investments and to discount the future in exchange for increased security in the present:

> Risk management in the present involves loyalty to institutions and organizations that presently work and deliver livelihoods, whatever the longer-term cost. Strategic preparation for the future…is continuously postponed for survival and securing in the present—the Faustian bargain. (p. 455)

For coffee farmers with sufficiently large asset endowments, risk management would partly involve investing in coffee production because it is secure enough to warrant such investment, despite the threats of fluctuating prices, unfavourable climate, and restricted access to inputs, among other things.

The limited ability of the poor households to invest in their future (in favour of survival in the present) raises serious questions about the ability of value chain development in general to provide a viable pathway out of poverty. However, discussions on this matter are scarce in the value chain literature. Little attention has been paid to understanding the risks and trade-offs that households face as related to their participation in a value chain for higher-value products; the assets that they have and do not have; or the external constraints that limit their ability to build assets. Important questions remain about whether VCDA facilitates poverty reduction among the poor with a small asset base. Can interventions effectively improve equity by addressing the limitations faced by the poor to build assets and improve their overall well-being? Alternatively, would development resources be better spent on improving food security? Such questions have yet to emerge in the debates on value chain development.

2.4.2 Experiences in collective enterprise development

From a development perspective, collective enterprises are attractive for development agencies because of their perceived ability to combine economic with environmental and social objectives, such as sustainable resource management, improved local safety nets, and member education. These enterprises typically fall into the category of small and medium enterprises (SMEs). Official SME definitions tend to focus on the number of employees and the annual turnover, but these criteria vary widely across regions and from country to country.

This thesis uses the term “rural collective enterprises” (RCEs) to refer to enterprises collectively owned by smallholders. The term includes various types of smallholder and community-based enterprises discussed in the literature, including cooperatives, producer associations, community enterprises, micro and small enterprises, and farmer organizations. Recent changes in the political and legal environment in developing regions offer possibilities for RCE development that did not exist before. Structural adjustment programs substantially reduced or eliminated state-backed marketing boards and production cooperatives, thus opening new spaces for RCEs in the commercialization of agricultural products. In addition, emerging segments and niches in agricultural product markets, such as organic and specialty fruits, provide incentives for new collective business endeavours, as well as attract external investments for upgrading RCE operations.

The literature is extensive and covers debate going back more than 100 years. This section presents a brief overview of some of the salient issues discussed in the more recent RCE literature. These issues are primarily concerned with RCE governance structures and their implications for long-term RCE viability and the design of services that support the development of RCEs. Much of this discussion follows a recent review of experiences in RCE development by Donovan et al. (2008) that was carried out in the context of collaboration with the Ford Foundation.

Internal factors affecting RCE performance

The governance of RCEs entails formulation of rules that ensure open and understandable election procedures; the division of responsibilities among the board of directors, managers, and members; and the establishment of internal control mechanisms and rules for the distribution of benefits. Case study evidence suggests that most RCEs struggle to establish effective governance, in some cases due to limited capacities and in other cases due to government interference.

At the most basic level, RCEs must adopt effective structures for defining who is a member and the costs and benefits of membership. In his review of some 400 RCEs in Chile, Berdegué (2001) found that all of those considered economically viable had formally structured their relations between members and management, as well as between administration and external actors (NGOs, buyers, processors). Critical among these were rules that governed who had the right to receive benefits and who paid the costs of operation. Among the poorest performing RCEs, economic benefits were not exclusive to members, with prices paid to members the same as prices paid to nonmembers. However, those with exclusive benefits often had limited capacity to adjust their benefits to members in response to increased competition

from local buyers. This resulted in members reducing deliveries to the RCE and increasing deliveries to intermediaries (side selling). Berdegué identified two other factors that contributed to RCE success: 1) strong member participation in RCE decision making and 2) relatively high levels of preexisting social capital, which allowed for effective conflict resolution among members and with outside agents.

RCEs tend to have various goals (economic, social, environmental) (Donovan, Stoian, and Poole 2008), but economic goals must be prioritized. In Senegal and Burkina Faso, Bernard et al. (2008) highlighted the difficulties faced by RCEs in combining social and economic objectives. They found that 38% of RCEs in Senegal and 84% in Burkina Faso had formalized rules and regulations but had varying degrees of success. However, such structures did not always translate into improved services for members—especially when RCEs were under pressure to deliver public goods. Results indicated that greater management capacity was related to increased performance for RCEs in Senegal. However, when greater management controls were motivated more by a concern for egalitarianism, as in the case of Burkina Faso, than for market integration, they were a negative factor for RCE performance. Similarly, delivery of public goods by an RCE was associated with lower performance, acting as a tax on members. They suggested that the negative relationship between performance and the level of controls existed in cases where equity and solidarity had greater priority than efficiency: for example, allocation of credit based on lottery or the frequent rotation of senior management posts among members. In the context of severe lack of resources, formalized administrative procedures thus seem to be motivated more by equity in benefit sharing than by efficiency in the formation of benefits.

In general, achieving the right balance between member control and effective management challenges most RCEs. In some cases, professional management may be the best option for acquiring human capital for RCE management. However, RCEs may be reluctant to offer sufficient compensation to attract the best or most appropriate management, instead relying on NGO support and/or board members (Bebbington, Quisbert, and Trujillo 1996; Donovan, Stoian, and Poole 2008), which often results in limited business capacities. Anderson and Henehan (2003) and Lele (1981) found that internally sourced, volunteer managers seldom had much experience in business, financial management, or marketing. RCE board members may fail to understand fully their roles and responsibilities, as they are usually staffed by members, who often have limited experience in business management or marketing (Donovan, Stoian and Poole 2009). As a result, board members tend to provide too little or too much oversight. However, effective RCE management skills

can be built up over time, often with the long-term access to support services. The case of El Ceibo in Bolivia provides a convincing example (Bebbington, Quisbert, and Trujillo. 1996), whereby long-term partnerships with donors and NGOs played a key role in capacity building in RCE administration among the membership base. However, such examples are rare in the literature.

RCE long-term survival depends on the transparency and equitable returns of the benefits across the membership base. Several researchers have addressed the ability of powerful community members to capture disproportional shares of the benefits—so-called elite capture; however, no clear consensus has emerged regarding it existence. In Mexico, Klooster (2000) described how a forestry elite circumvented the democratic potential of RCEs through intimidation, manipulating elections, dodging oversight, and discouraging participation in community assemblies. Chirwa et al. (2005) argued that elite capture of benefits was more likely to occur during the initial stages of RCE development when RCEs are more likely to gain from strong, centralized leadership unconstrained by bureaucracy and when RCE members lack basic literacy, business skills and experience. Under these conditions, local elites can more easily "capture" the organization and allow leaders to misuse RCE resources. On the other hand, Bernard et al. (2008, 22) detected no obvious signs of elite capture of benefits among RCEs in Africa: "We have seen that high concern with equity in setting up bureaucratic procedures, which is effective in fending off elite capture, may occur at the cost of efficiency." Bebbington, Quisbert, and Trujillo (1996, 201) also found limited evidence in the case of El Ceibo in Bolivia: "Over time there has been a progressive decentralization of administration in the organization. There are now various loci of decision making,…such that power is somewhat dispersed among several teams and its Administrative and Overview Councils."

The importance of direct member participation in RCE governance remains a matter of debate. Crouture et al. (2002) argued that members' involvement was essential at all levels of RCE functions. In practice, however, RCE members may be reluctant to participate in RCE governance because the 1) economic benefits from RCE services are low (and their opportunity costs are high) and 2) perceptions may exist that there is limited opportunity to influence the outcomes of RCE operations or strategies. Bernard et al. (2008) argued that no clear consensus existed in the literature regarding whether more or less participatory governance is conducive to RCE development. The case for less participatory governance rested on the notion that leaders provide technical expertise, drive, and continuity, while too much participation by inexperienced members may impair an RCE's capacity to identify and

pursue higher income-generating strategies. On the other hand, more participatory governance allowed for enhanced sustainability and effectiveness of the organization as it helps to adjust decision making to local conditions and customs.

Role of external services in RCE development

Access to the right combination of externally sourced services at the right time is critical for RCE development (Tendler 1983; Bebbington, Quisbert, and Trujillo. 1996; Chirwa et al. 2005; Nittler and Tschinkel 2005). However, important questions remain about what services are needed and how best to provide them. The discussion here targets financial services and nonfinancial services (technical and business services).

Discussions on financial services have generally focused on the provision of services to households and to individually owned microenterprises rather than to RCEs. Historically, access by the poor to formal credit services has been limited due to weak competition in the banking sector and the high transaction costs (real or perceived) associated with lending. A first attempt to address this problem looked at subsidized credit programs; however, these did little to achieve increased access by the poor to financial services (Gonzalez-Vega 2003). In the 1990s, efforts focused on the development of microfinance institutions (MFIs), which attempted to reach the poor with services based on sound financial procedures (cost-recovering rates and management autonomy). However, the success of MFIs in reaching households, often urban-based, did not spill over into increased access to financial services for more developed enterprises, whose service needs are more related to liquidity and risk management. In their analysis of MFIs in Nicaragua, Bastiaensen and Marchetti (2007, 148) concluded that as MFIs focused their objectives on poverty alleviation, they ceased to contribute to the strengthening of enterprises. As a result, less attention was dedicated to longer-term investment credit and provision of risk capital. It was this type of capital, however, that is largely absent from current microcredit supply and that could allow poor, capital-constrained entrepreneurs to engage in more sustainable changes in their livelihood strategies.

Traditionally, services for capacity building have focused on technology transfer by government agencies and projects, whereby a limited portfolio of free services was offered to selected RCEs. In the late 1990s, however, inspired by the apparent success of MFIs in reaching the poor through market-based service delivery, donors advocated moving away from services offered for free or heavily subsidized by state organizations toward the development of markets for services (Field et al. 2000; World Bank 2001). In this context, donor investments were required to improve the quality and increase the coverage of services, with the understanding

that higher quality services would eventually lead to higher effective demand for services. However, the development of service markets in the rural sector proved challenging given the poor's limited ability to pay for services and limited supply of services. In general, the market development paradigm's failure to address how to build service markets in the context of persistent poverty and weak institutional frameworks meant that donors and governments continued to play a major role in providing services for RCE development (Philip 2003). Experiences suggested a need to identify more ambitious and comprehensive interventions that could deliver benefits throughout a given sector (Dawson 2003). Along this line, Sievers and Vandenberg (2007) highlighted the potential for synergies to be derived from coordination of service delivery among different specialized providers. Based on evidence from 30 case studies, they identified success factors for linking business advisory services with financial services for microenterprise clients. Evidence suggested that combined delivery resulted in higher income for clients.

2.4.3 Summary

- During the coffee crisis, researchers argued the poverty-reducing potential of value chains for certified coffee, focusing mainly on the economic benefits from price premiums over conventional coffee. A major motivation behind the push by development organizations and Northern buyers for value chain development in certified coffee was to maintain competitiveness through higher quality (either at the regional or chain level).
- Research carried out following the coffee crisis presented the impacts of certified coffee value chains in a generally unfavourable light. Discussions highlighted the limited ability of the poor to benefit from higher prices due to their low productivity and their need to cover short-term needs at the expense of building future capacities.
- Cooperatives and other forms of RCEs provide a vehicle through which downstream chain actors and NGOs can channel support for value chain development. Discussions in the literature agree that effective governance is vital to RCE success, especially in more-demanding market environments. At the same time, it is recognized that effective governance is difficult to achieve because of the multiple interests of members and the limited business experience by leaders and members. Evidence has shown that RCE governance structures tend to be weak, often resulting in a low sense of ownership among members and poor business performance.

- Discussions on certification and RCEs provide limited information for guiding government and civil society in the design of more efficient and effective development interventions. Little attention has been paid to understanding the risks and trade-offs that households and RCEs face, the assets that they have, or the external constraints that limit their ability to build assets.
- Finally, insufficient attention has been paid to the organisational development and life cycle of RCEs. The path to viability can take decades rather than years, requiring sustained external support. Commonly RCEs are subject to periods of organisational failure and rebirth (e.g., Kachule, Poole, and Dorward 2005).

2.5 Research gaps related to VCDA and rural poverty

This section recapitulates what we know and do not know about the poverty implications of VCDAs, based on the literature from chapters 1 and 2. The following points summarise what we know from the literature:

- Discussions on NTAE promotion provide limited evidence that NTAE had meaningful or lasting impacts on rural poverty. In many cases, smallholders stopped participation due to falling prices, increasing quality requirements, and lack of inputs.
- During the 2000s, governments and civil society began to focus more explicitly on poverty reduction and rural development. This led to renewed increased in the possibilities of the poor to link with higher-value markets. Interventions for value chain development typically focused on upgrading the capacities of smallholders, their business organizations, and other resource-constrained chain actors to meet quality and environmental performance requirements.
- RCEs can play a critical role in VCDA. In some markets, such as fair trade markets, they are essential for achieving market access. However, they typically have weak governance, limited income flows, and limited asset endowments, which result in long development processes. In addition, RCEs often face an incomplete and ineffective service offer and unsupportive policy and legal frameworks.
- The literature shows limited understanding of the poverty impacts of VCDA. This provides the public sector and civil society organizations with limited evidence to justify their use funds and precludes learning opportunities for improving and scaling up.

The following points identify information gaps in the literatures on rural livelihoods, asset building, and value chains:

- The role of preexisting asset endowments in determining the poor's ability to participate effectively in VCDA
- The ability of development interventions to identify and address asset building needs of the poor so that they can effectively participate in VCDA
- The role of collective enterprises in facilitating chain linkages and in facilitating the asset building needs of the poor to allow them to effectively participate in VCDA
- The ability of the poor to invest in the building of assets through their participation in VCDA, taking into account household strategies, the overall risk context faced by households, and the potential trade-offs between more-intensive participation in value chains for certified coffee and subsistence activities.

3 Value chain approaches from an asset perspective: A conceptual framework

3.1 Introduction

This chapter presents a conceptual framework for assessing the poverty impacts of VCDA. The framework considers value chains and their role in reducing poverty from the perspective of rural households and the enterprises that maintain direct and sustained linkages with them (referred to here as "upstream enterprises"—where upstream signals the chain segment nearer to primary production). In the case of value chains for certified agricultural products, these enterprises are often cooperatives or similar types of RCEs. The focus on upstream enterprises recognizes that the link between asset-poor producing households and higher-value agriculture markets often depends on the ability of upstream enterprises to supply essential services to producing households (e.g, credit, certification, technical assistance). It also recognizes that upstream enterprises may receive interventions for value chain development from various sources, including downstream enterprises, governments, and NGOs. At the household level, poverty reduction is conceptualized in terms of asset building and livelihood security.

The basic elements of the conceptual framework emerged out of a multi-organizational effort financed by the Ford Foundation and led by the Tropical Agricultural Research and Higher Education Centre (CATIE)[22] to design tools for assessing the poverty impacts of VCDA. Collaboration aimed to provide development organizations with a field-tested conceptually and methodologically robust tool for assessing the poverty impacts of VCDA. We use "poverty impacts" to refer to the changes in assets endowments of rural households in response to interventions for value chain development. We assume that improved endowments of assets lead to improved well-being and increased vulnerability. The assessment of development interventions has focused generally on assessing the intervention's success in meeting its specific objectives and outcomes (see Roch 2002; ISEAL 2010) rather than its success in facilitating the broader process of building various assets over time. Project assessment, by its very nature, would fail to account for the fact that

[22] Collaboration with the Ford Foundation began in 2007 when CATIE and the School of Oriental and African Studies (SOAS) carried out a review of experiences in the development of rural collective enterprises in Africa, Southern Asia, and Latin America (see Donovan, Stoian, and Poole 2008). The research included more than 20 case studies on enterprise development and provided a template for the interregional and multiorganizational work carried out in the design and validation of the methodology for assessing the poverty impacts of VCDA.

interventions for value chain development are often uncoordinated and come from various sources, including downstream buyers, government agencies, and NGOs—again suggesting that project assessment is too narrow in scope to provide the depth of information needed for improved the poverty-reducing performance of VCDA.

Between 2008 and 2010, representatives from more than 30 organizations participated in the design of a conceptual and methodological framework for assessing the poverty impacts of VCDAs. Mayor collaborative work on the design of the frameworks occurred during two workshops at CATIE. During the first workshop (October 2008), participants deliberated concepts related to poverty and value chains and the basic elements of a methodological approach for assessing the poverty impacts of VCDA. Debate focused on the trade-offs between rigor and ease of implementation, which was considered critical if the assessment tool was to be applied in the field. Following this workshop, detailed methodological guidelines were prepared (Donovan and Stoian 2009) and later implemented in the context of 12 case studies in Africa, Asia, and Latin America. The case study presented in this thesis was one of these cases. During the second workshop (October 2009), participants discussed the results from the cases studies and their implications for assessment design. The workshop highlighted the potential for an asset-based approach to identify opportunities for the redesign of VCDA for improved asset building. However, it also highlighted the difficulty to achieve the depth and rigor needed for the improved design of VCDA while keeping the assessment firmly in the hands of development practitioners, as well as the limitations of existing mindsets and attitudes for identifying mistakes/gaps in VCDA design and negative outcomes in asset building. Discussions in this chapter draw on essential elements of the conceptual framework that emerged out of this international and multiorganizational process.

3.2 Framework for assessing asset building at enterprise and household levels

This section presents the conceptual framework for the assessment of asset building at the upstream enterprise level and household levels. The framework at the enterprise level incorporates concepts and lessons learned from the literatures on value chains (e.g., trust relations and information and resource sharing) and rural collective enterprises (governance structures and service provision). The framework at the household level combines key concepts from value chain and rural livelihood discussions. It recognizes that households engage in various chains in addition to subsistence activities and face tradeoffs to intensify their investments in any one activity.

3.2.1 Assessing asset building at the enterprise level

The underlying hypothesis is that asset building (increased assets and higher quality assets) by upstream enterprises improves their long-term business viability and their ability to offer expanded and improved services to their raw material suppliers and downstream buyers. Asset building by the upstream enterprise, in turn, depends on various factors, including the context in which the enterprise operates, linkages between the upstream and other actors (e.g., smallholders, services providers, downstream buyers), and the role of preexisting asset endowments and other factors (fig. 2). The asset-building framework for assessment is extended to the enterprise level by adjusting the indicators applied for each capital to capture business viability, rather than well-being and resilience of households.

Changes in the political and marketing context can have a direct positive or negative effect on the ability of upstream enterprises to build assets. Understanding these changes also helps to single out the effects of the VCDA. The World Bank's Doing Business project brought considerable attention to the role of the business environment in shaping the long-term development prospects of business in developing countries. In many developing countries, existing policies, laws, rules and regulations are incomplete, conflicting and/or overly complicated (e.g., complex export procedures, lack of financial incentive schemes, ill-suited legal forms) and thus are rarely conducive to rural enterprise development (Donovan Stoian and Poole 2008). Market trends make up another important element of the context. In cases where upstream enterprises participate in specialty markets, such as tropical fruits, changes in the market environment can be quick and unpredictable. In other cases, markets are characterized by prolonged boom and bust cycles, such as those of cocoa and coffee. In either case, understanding the market context (and the enterprise's ability to identify and respond to changes in the context) provides insights into the long-term viability of the enterprise.

An upstream enterprise's linkages include those with raw material providers (farming households), support services (including credit providers), and downstream buyers. Relationships with producers are often two-way: where producers provide the enterprise with raw material and the enterprise provides them essential services for production (in addition to the market outlet). In some cases, different types of providers may link to the enterprise. For example, intermediaries and larger-scale producers may be especially important for achieving scale. Upstream enterprises often provide services to their members. The ability of the enterprise to provide services may depend on factors such as links with donors and government agencies, overall level of consolidation of the upstream enterprises, and market orientation

(e.g., coffee and cocoa specialty markets have been a major focus for donor interventions, while markets for lesser known fruit and vegetable products have received considerably less attention). Linkages with service providers offer access to inputs and services that help upgrade their technical and business capacities and expand their service offer to linked smallholders. Analysis of the linkages between services providers and upstream enterprises focuses on such issues as usefulness of services received for expanding and improving capacities and services needed but not available.

Upstream enterprises usually link with various buyers operating in different markets (local, national, international). In some cases, upstream enterprises may provide semiprocessed or processed products to downstream buyers and receive certain benefits in return—for example, long-term contracts at favourable terms, access to information and joint strategy formulation, and co-investment in infrastructure and capacity upgrading. Analysis of the linkages with downstream enterprises focuses on such issues as risk and benefit sharing, participation in strategy formulation, information sharing, and services offered for upgrading.

Another potential factor that determines the ability of RCEs to build assets is the level of preexisting assets. Four asset types, or capitals, are considered: human, social, physical, and financial. Human capital refers to the skills and capacities to administer the business and maintain relations with buyers and members. In the case of RCEs, human capital exists at the level of professional management, support staff, and volunteer leadership. Following Uphoff and Wijayaratna (2000), social capital is considered as structural in form (roles, rules, procedures, and precedents as well as social networks that establish ongoing patterns of social interaction) and cognitive in form (norms, values, attitudes, and beliefs that predispose people to cooperate). Physical capital refers to the stock of tools, machinery, and infrastructure for storage, production, processing, administration, and provision of services to members. Financial capital includes access to credit, credit portfolios (for provision of credit to members), risk management tools (e.g., insurance), and income stocks and flows. Internal factors in addition to asset endowments that are likely to influence asset building by upstream enterprises are history, organizational form (e.g., cooperative versus privately owned enterprises), and objectives (economic, social, environmental).

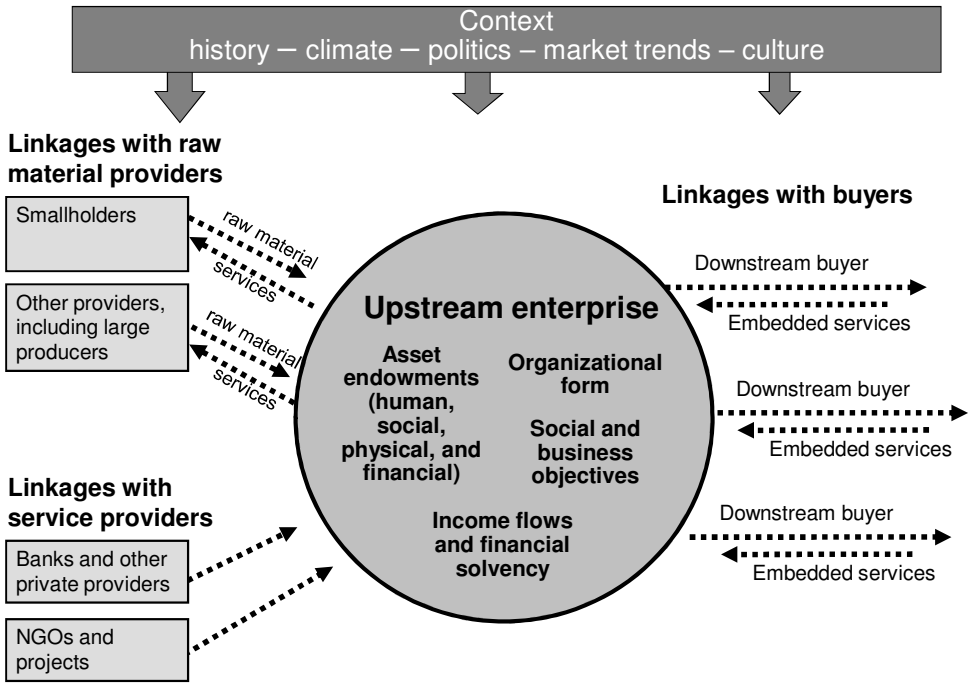

Fig. 2. Linkages for asset building by upstream enterprises

3.2.2 Assessing asset building at the household level

The underlying hypothesis is that asset building (increased assets and higher-quality assets) by households improves their well-being and increases their resilience to shocks. Asset building by households, in turn, depends on several factors, including linkages with various market actors, preexisting asset endowments, and livelihood strategies (e.g., off-farm employment, remittances) (fig.2).

In the spirit of the livelihoods debates, assets are considered to be both tangible and intangible and used for productive activities and/or for household subsistence. The following five asset capitals are considered: natural, human, social, physical, and financial. Ownership of a particular asset may be either individual or collective. For example, a forest may be owned or used by the state and/or one of several communities. Certain assets are only effective if combined with others. For example, access to high-quality land many have different implications for livelihood outcomes depending on access to credit and transport infrastructure.

Assets are in constant use and recombination by the household. The building (erosion) of one asset can imply positive (negative) feedback loops that lead to asset building (erosion) of other assets. For example, a healthy and productive coffee plantation (natural capital) may be derived from improved farming knowledge (human capital) through training and technical assistance that translates into higher income

(financial capital), which in turn is (partially) reinvested in processing facilities (physical capital) that allows for higher value added (financial capital). Alternatively, forest degradation or soil erosion through inappropriate management techniques and the removal of coffee plantations may compromise natural capital and lead to reduced productivity and, hence, lower income, which in turn impedes investments in other assets.

In most cases, participation in a given value chain will represent just one household activity for generating income and accessing services (fig. 3). Other activities may include the production of relatively low-value (and low-cost) products for sale in local markets and participation in off-farm employment. While in some cases, products sold in local markets may generate lower returns, they may be critically important for household subsistence, providing access to food during times of reduced income and producing various harvests throughout the year, providing smoother income and consumption patterns. In addition, value chain linkages may facilitate access to vital services for agricultural production, such as production inputs, short- and long-term credit, and technical assistance.

Value chain development influences asset building by farming households, if not livelihood strategies as a whole, both directly (through provision of services, such as technical assistance and grants) and indirectly (through increased income gained from access to high-value markets). Services for developing the value chain are provided by NGOs, government agencies, and/or by buyers and private-sector input providers. These services can be crucial for building a critical minimum level of assets needed for effective participation in the value chain. For example, technical services may be required for increasing productivity and improving quality control. Business development services may be needed to improve the organizational structures of collectively owned enterprises, as well as to maintain their relations with existing buyers and diversify their buyer contacts. Financial services may be required by both households and collectively owned enterprises to facilitate the purchase of needed production inputs during the year.

Two factors are considered central to understanding a household's ability to build assets because of its participation in VCDA. One is the existence of asset thresholds. The notion of asset thresholds suggests that there exists a certain minimum combination of assets that are necessary if a household is to participate in and benefit from VCDA. If a household's endowment falls below the threshold, then it is likely to be caught in a vicious circle that results in persistent poverty: it does not have the assets to fully participate in and benefit from VCDA and its ability to build the required assets is highly limited due to its low participation in the VCDA (and

limited participation in markets). These households are unlikely to be willing or able to shift assets from subsistence to market-oriented production or mobilize new assets (e.g, through credit or grants) for production.

The second issue relates to asset building and erosion over time. Asset building is nonlinear: assets built up at the beginning of the VCDA may be highly eroded a couple of years later, only to be partially rebuilt by the time of assessment. Exposure to the risk of negative events is determined by the context (e.g., negative market trends, stricter regulations), market linkages (for example, changes in quality requirements), and other relevant factors (climate, land seizure, divorce, death). Risk-reducing mechanisms include the diversification of market linkages, access to services from government and NGOs, and the reallocation of assets among various livelihood activities (for example, reduced assets for market linkages and increased asset concentration in subsistence and off-farm labour supply). Better understanding of causes of asset erosion will contribute to the design of more effective interventions for value chain development. However, most research on asset endowments in the livelihoods literature is static in nature. It is argued here that a dynamic approach is required that would allow for a discussion of asset building (erosion).

The concept of vulnerability is linked closely to that of asset building. In theory, the more assets households have, the less vulnerable they are; the greater the erosion of these assets, the greater is livelihood insecurity (Moser 1998). Vulnerability considers a household's limited ability to cope and recover from external shocks and stresses without damaging consequences (Chambers 1989). Resilience, on the other hand, refers to the responsiveness of households in exploiting opportunities and in resisting or recovering from the negative effects of a changing environment. The ability of households to limit the impact of external shocks and respond to adverse trends depends on the opportunities and limitations for building assets and pursuing secure livelihood strategies. A detailed analysis of vulnerability/resilience at the household level is beyond the reach of this framework. However, specific considerations are taken into account, including 1) extent to which households are exposed to shocks, adverse trends, and seasonality effects and 2) the assets available to minimize adverse effects.

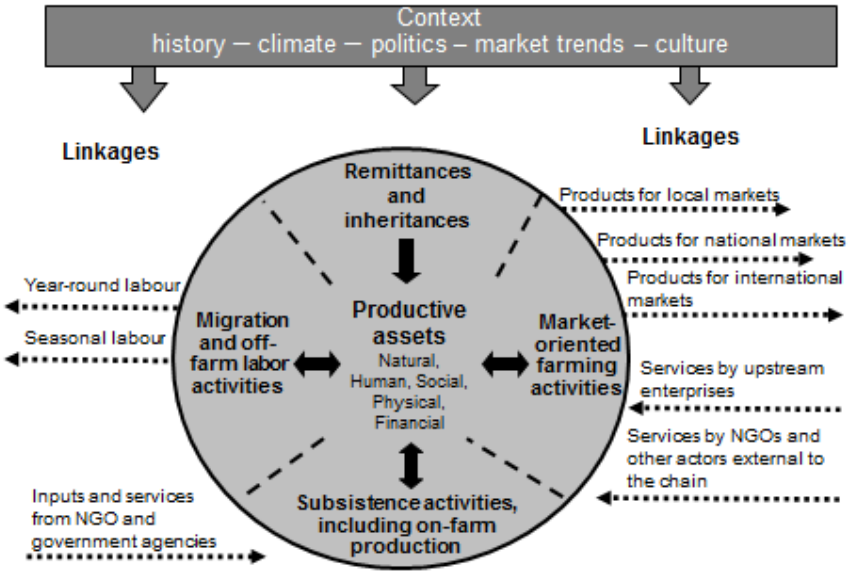

Fig. 3. Linkages for asset building by rural households

3.3 Strengths and limitations of the conceptual framework

The conceptual framework presented here lays out an alternative approach to assessing the poverty impacts of value chain approaches. Its strengths include:

- Rather than focusing on changes in income or production in response to a single intervention, the framework examines changes in asset building at the household and enterprise levels in response to a set of interventions for value chain development. While this increases complexity, it also allows for a more compete perspective on poverty impacts and the related opportunities for improved (re)design of VCDA.
- By focusing on the capacity of upstream enterprises to develop relations upstream with rural households and downstream with buyers and processors, the framework integrates the value chain concept into assessment. To date, assessments of private sector development interventions have yet to incorporate this combined focus on enterprise and household (e.g., DCED 2008).

Among the limitations presented by the framework are

- While VCDA generate changes at various levels: household members, households, community/territory, individual enterprises, and the chain as a whole, the framework focuses attention only at two levels. Information on the relations among household members (e.g., gender equity in benefit

sharing) would provide a deeper understanding of the strengths and limitations of VCDA for improving addressing poverty. Likewise, information on changes at the community/territorial level (e.g., effects on hired labour or social exclusion, e.g., Arce 2009) would allow for understanding of spillover effects of value chain development.

- Attribution of changes in assets focuses on two potential causes: the set of value chain development interventions and the overall context (e.g., change in local prices). In some cases, attribution is straightforward, for example, increased skill sets for coffee production, given an understanding of the interventions and the overall limited supply of technical services for coffee. Where changes depend on cash outlays, it may not be possible to distinguish between either of these two causes (e.g., increase in local prices for coffee and increased access to credit). A more nuanced understanding of case-effect relations would be possible with detailed baseline and monitoring data for the individual interventions that make up the VCDA. However, in many real world assessment situations, such information does not exist. This also implies that the role of endogenous factors (e.g., history, attitudes) and some external factors (e.g., racism, class) are downplayed. This limitation can be addressed partially with information from key informants.

The next chapter presents a methodology for implementing this conceptual framework in the context of a case study on value chain development in the coffee sector in Nicaragua.

4 A case study of value chain development in Nicaragua

4.1 Introduction

This chapter presents the methods applied in the case study for assessing the poverty impacts of value chain development approaches (VCDA). As previously noted, the case study focused on the second-tier coffee cooperative Soppexcca and its upstream linkages with 1) hundreds of smallholder farming households in the Jinotega-Matagalpa region of Nicaragua and 2) its downstream linkages with buyers of certified coffee in Europe and the United States. The selection of Soppexcca for this study responded to interest expressed by the NGO Lutheran World Relief (LWR) —a partner in the CATIE-Ford Foundation collaboration for designing tools for assessment of VCDA—in better understanding the poverty impacts of its interventions for the development of value chains in certified markets. LWR's work with Soppexcca fell within its declared objective "to improve livelihoods via better and more economically productive participation in the agricultural value chain" (LWR no date, 2).

The case study approach provided the best option for understanding the change in assets over time and the reasons behind the changes. The approach implies that our understanding of the VCDA contribution to asset building by rural households will be based on the context (the intervention and nonintervention factors that contributed to changes in the impact indicators identified, as well as the relative importance of these factors) (Mohr 1995, 1999). In other words, for any observed or identified change, the task of the researcher is to demonstrate that the treatment caused the change. Despite the qualitative nature of the approach to attribution, however, both quantitative and qualitative data are collected and analysed. This chapter focuses on the methods for collection and analysis of the quantitative and qualitative data.

4.2 Methods mix

Both quantitative and qualitative data collection techniques were employed in the case study. To the extent possible, quantitative information was collected to understand the changes in assets and qualitative information was used to understand the relevance of the changes and the reasons for the changes. The use of qualitative data differentiates this study from the strictly quantitative assessments of asset building that are most commonly found in the development literature. In this way, the methodology employed here recognises the contribution of researchers in the

development field that have exhorted the use of more people-centred approaches to assessment (e.g., Haddad, Lindstrom, and Pinto 2010; Chambers 2006).

The following data collection methods were used for identifying changes in asset endowments and their causes at the upstream enterprise and household level: key informant interviews, structured interviews (household-level only), and situation-specific documents/databases.

- *Key informant interviews*: Key informants provided information for the enterprise-level assessment and for interpretation of the results at the household level. Interviews were carried out with: base cooperative leaders (3), boards of directors (3), senior Soppexcca staff (3), Soppexcca buyers in the United States and Europe (3), leaders of other certified fair trade cooperatives in Nicaragua (4), representative from organic certifying agency (1), small-scale coffee buyers in local markets (10), large-scale coffee buyers in local markets (2), and Soppexcca extension staff (6).
- *Structured interviews*: Structured interviews with farming households affiliated with Soppexcca provided information on their existing assess endowments, changes in these endowments over time, their perceptions of the reasons behind the changes, and the utility of various inputs and services for agricultural production. Structured interviews sought information of both a qualitative and quantitative nature and included both closed and open-ended questions.
- *Situation-specific documents/databases:* Soppexcca provided secondary information in the form of consultancy reports, certification reports, internal documents (strategic plan, financial information), and databases (member list and detailed credit history for each sampled household). This information assisted in identifying changes in asset endowments at both enterprise and household levels.
- *Validation and feedback events*: Preliminary results were presented to the staff of Soppexcca and LWR for feedback and validation (Soppexcca offices, January 2010). Results were also presented for discussion at a CATIE-Ford Foundation workshop on value chain assessment (Costa Rica, October 2009), a FAO workshop on value chains (Rome, June 2010), and an ISEAL Alliance workshop on assessment of certification systems (London, August 2010).

4.3 Data collection methods

Data collection at the upstream enterprise and household levels focused on changes in assets, the causes of the changes, and their relevance to business viability or livelihood security over a specific time period. At the upstream enterprise level, secondary information and key informant interviews provided information. At the household level, secondary information on asset endowments during the period did not exist for the vast majority of indicators. Thus, recall information was sought on changes in assets. Recall can provide useful data for assessment under certain conditions (Bamberger 2004). In the case of this research, efforts to increase the reliability of recall information provided by the sampled households included 1) extensive pretesting of the household-level data collection guide (see discussions below) in collaboration with Soppexcca and LWR staff and 2) the use of key informants, including community members and Soppexcca extensionists, to triangulate information provided by households. Extensive pretesting also provided an opportunity to train data collectors in detecting and responding to errors (inconsistencies) in reporting.

The assessment period covered the period between the 2004/2005 and 2008/2009 coffee production years.[23] This period followed a period of major interventions by buyers and NGOs to facilitate Soppexcca's participation in value chains for certified coffee. The first of these interventions took place in the early 2000s by European buyers and played a critical role in the organisation of Soppexcca. Major interventions by NGOs followed during the coffee crisis between 2003 and 2007. In general, the less routine and more significant a payment, purchase, or other event was for a household, the longer the recall and vice versa. For example, a five-year recall period was determined feasible for deliveries of coffee to Soppexcca (as this is a once-a-year event that determines a significant part of their income), as well as for other major purchases (e.g., fertilizers, major consumer durables). A one-year recall period served for indicators that addressed more routine and/or less significant events, such as contribution of other income sources to total income.

4.3.1 Data collection at the upstream enterprise level (Soppexcca)

The enterprise assessment yielded data on 1) changes in productive assets over the assessment period, 2) what factors contributed to these changes, and 3) the relevance of these changes for Soppexcca's long-term viability. Regarding changes

[23] The coffee production year in Nicaragua begins in April and ends in March of the following year. Activities in spring focus on plant management (pruning, shade management) and fertilization, while activities between November and February focus on harvest and postharvest management.

in assets, or capitals, the following types were included in the assessment: human, physical, social, and financial. Natural capital was not included since Soppexcca does not engage directly in primary production. For each capital included, between two and three indicators were identified. Table 2 displays these indicators and the data collection methods used to respond to the indicators.

Data collection relied upon key informant interviews with Soppexcca staff and collection of secondary information during an 11-month period between March 2009 and January 2011. Several advantages resulted from such an extended data collection period, including: 1) ability to build working relationships with Soppexcca staff and 2) the ability to triangulate information and deepen questioning based on information collected from other sources. Among the Soppexcca staff interviewed were the managing director, director of extension, director of credit, and members of the board of directors. The staff members were consulted on various occasions during the data collection period. Soppexcca supplied valuable secondary information on membership (critical for design of the sample frame for household data collection), credit provision over the past five years, relations with buyers, and business strategy and performance.

Identifying the various factors that contributed to Soppexcca's changes in asset endowments was based on secondary information from Soppexcca, reports by NGOs and consultants, and key informant interviews with Soppexcca staff. Given that external interventions made a significant contribution to most of the investments in assets during the assessment period, determining causality was generally straightforward. The relative ease of attribution was also facilitated by the limited amount of retained earnings held by Soppexcca for major investments in productive assets (e.g., physical and human capital). Buyers or other actors along the value chains in which Soppexcca participated did not make direct investments in the building of Soppexcca's assets during the assessment period.

Table 2. Indicators of asset building at the enterprise level

Capital	Indicator	Data collection methods
Human capital	• Change in ability to administer basic services for buyers and household producers • Change in ability to provide effective on-site technical assistance to producers	• Key informant interviews with Soppexcca staff • Secondary information • Key informant interviews with coffee buyers in Europe and the United States • Key informant interviews with members of board of directors
Physical capital	• New investments in infrastructure, including machinery, equipment, tools	• Secondary information (project reports, Soppexcca reports) • Key informant interviews
Social capital	• Change in member participation in Soppexcca's governance • Change in the diversity and strength of relationships with buyers	• Secondary information on sales and buyers • Key informant interviews with members of board of directors • Dialogue with Soppexcca members
Financial capital	• Change in access to credit • Change in savings level and liquidity • Change in income flows • Change in credit distributed	• Secondary information

4.3.2 Data collection at the household level

The household assessment yielded data on 1) changes in productive assets over the assessment period; 2) factors that contributed to these changes; and 3) the relevance of these changes to livelihood security. A structured interview was applied to a representative sample of Soppexcca-affiliated households. Key informant interviews and validation workshops were used for interpretation of results and filling information gaps.

Sample frame design

Soppexcca provided a list of affiliated households for the design of the sample frame. However, the information contained in the list was limited to name and base-cooperative affiliation. No information was available on location of the households or their coffee production volumes (only production volumes delivered to Soppexcca, which, in some cases, proved only a fraction of total coffee production).

In this context, it was decided that base-cooperative affiliation, where each member who belonged to a given base cooperative was included in the sample, offered the best approach to sample design. Among the 16 base cooperatives in Soppexcca in 2009, 11 were selected for inclusion in the sample frame. With inputs

from Soppexcca staff, base cooperatives were selected based on 1) distance from Soppexcca's headquarters, with a roughly equal number of cooperatives located less than 25 km, between 25 and 50 km and more than 75 km; and 2) the geographical closeness of households in a given base cooperative. (All things being equal, cooperatives whose members were more concentrated in a given area were preferred to cooperatives with a lesser degree of concentration. This reduced costs of data collection without introducing bias into the sample.) A limited number of households from the other six cooperatives were also included in this study. This allowed for inclusion of all of the organically certified households. Selected base cooperatives were located in the north-central part of Nicaragua, where the majority of the country's coffee production takes place (fig. 4).

Source: Embassyworld.com (2011)

Fig. 4. Map of Nicaragua, with study area located in blue oval

The sample included 292 coffee-producing households, or approximately 60% of the total reported membership of all the base cooperatives affiliated with Soppexcca and 95% of the total reported membership of the 11 base cooperatives (table 3). Households from the total reported membership of the selected base

cooperatives not interviewed for this study were those that had 1) sold their coffee-producing land, 2) refused to be interviewed or 3) were unavailable after two visits to their home. In total, 16 households were not interviewed. In cases where a household included two Soppexcca members and the two members produced two different types of coffee—for example, one was an organic producing member and other a conventional producing member—the one with the organic system was chosen.

Within the household, both female and male heads of household were invited to participate in the interview. Questions related to production and land use were directed to those household members who directly participated in coffee production and harvest. In most cases, this was the male household head. Questions related to household consumption and changes in access to health care and education were directed to the female household head. Each interview lasted between 45 minutes and 1 hour and 15 minutes, depending on the complexity of the production system and changes in assets. Four to five interviews were carried out per day by each data collector. Travel time between households was generally 15 to 30 minutes (walking). In a few cases, up to two hours were required to reach households.

Table 3 Sample frame, by production type and base cooperative

Soppexcca base cooperative	# households producing conventional coffee	# households producing organic coffee	Total # households
Julio Hernández	28	0	28
La Unión	24	1	25
La Unidad	9	0	9
Osmán Martínez	15	4	19
Feliciano Hernández	19	2	21
Ernesto Acuña	23	2	25
Los Alpes	25	8	33
El Esfuerzo	18	20	38
Jesús Rivera	29	2	31
Bernardino Días Ochoa	20	11	31
Juan Fernández	6	13	19
Other base cooperatives	5	8	13
Total	221	71	292

Data collection and management

Two data collection assistants, one male and one female, collected household-level data. Where possible, the female assistant collected data from households where a female was affiliated with Soppexcca. Soppexcca extension staff facilitated contacts with community leaders but did not participate in household-level data collection. This allowed for confidentiality of the information provided by households and increased the level of trust between household members and data collectors. Local guides were

contracted for identifying the Soppexcca-affiliated households within a given community or base cooperative. Data collection assistants visited a given community for several days, often staying at a Soppexcca member's home (rather than at the local Soppexcca office). This facilitated a more relaxed atmosphere and willingness to talk on the part of the respondents. The lead researcher accompanied the assistants in household interviews, observing household responses, asking follow-up questions for clarification and deeper understanding, and providing feedback to assistance on their performance.

The elaboration of the household-level data collection guide took place in various iterations over a two-month period. A first draft was elaborated at CATIE, applying the general set of indicators that emerged from the international collaboration between Ford and CATIE and was adjusted based on preexisting knowledge of Soppexcca and the Nicaraguan coffee sector in general. This first draft was implemented by the field assistants, together with the lead researcher, over a three-week period, with 14 coffee-producing households that belonged to an organic and fair trade cooperative having characteristics similar to those of Soppexcca. At regular intervals during the testing process, the data collection assistants and lead researcher reflected on information obtained and the changes needed in the data collection guide and interview techniques. Testing highlighted various options for simplifying the data collection guide. For example, questions on the hiring of labour for coffee production were removed (despite its importance to coffee production and livelihood security) due to the complexity of the issue (and the need for numerous layered questions) and the difficulty of the households to assess changes in labour usage over time. Two weeks into the data collection process, additional modifications were made based on lessons learned in the field (e.g., addition of more detailed questions on fertilizer usage and the selling of coffee outside of Soppexcca). Repeat trips were made to those households interviewed with the previous version of the data collection guide.

Following the data collection in the field, a consultant entered the information contained in the completed household level data collection guide into a Microsoft Access database. The data collection assistants reviewed each digitalized interview in the database to ensure accuracy or similarity between written household responses in the data collection guide and recorded responses in the Access database. The lead researcher also reviewed the database to identify any remaining contradictions and omissions in household responses. Contradictions and omissions were dealt with in one of two ways. In some cases, contradictions were addressed by triangulating information with Soppexcca technicians and responses from other

members of the base cooperative. In the majority of cases, however, the data collection assistants, with the lead researcher, made repeat visits to the households.

Household-level data collection guide

The household-level data collection guide provided a template for the collection of quantitative and qualitative data across each of the five livelihood capitals (see annex 1). The data collection guide was formulated based on three to four indicators per capital. Table 4 displays the indicators used.[24] In general, asset-based assessments in the literature include one indicator for each capital (although, sometimes excluding social capital) that is relatively easy to measure but that provides limited insight into a household's livelihood security (e.g., see asset indicators listed in Hossian et al. 2007 and Bourdillon et al. 2007). Two types of indicators were used: primary indicators and supporting indicators. Primary indicators provide the best information to assess the degree of success in asset building. Supporting indicators provide information that allows for a better understanding of the primary indicators. Indicators addressed outcomes of interventions rather than simply capturing the outputs of the interventions. For example, rather than focusing on participation in training events (a project outcome), human capital indicators refer to changes in capacities and skills for coffee production.

- *Natural capital*: The four primary indicators for natural capital focused attention on 1) changes in land area under agricultural production, 2) changes in area under coffee production, 3) changes in fertilizer usage (as a proxy for soil health), and 4) changes in wastewater disposal and herbicide usage (as proxies for environmental health). Data on land area and area under coffee production were collected at the start and end of the assessment period. Households reported their usage of fertilizers over a three-year period. Given the relatively high price for fertilizer (and the fact that it was purchased only once in a given year), households generally had little difficulty in recalling fertilizer purchases. Households reported production practices for the disposal of wastewater from wet milling and on herbicide usage at the beginning of the assessment period (or the year prior to joining Soppexcca, whichever came first) and at the end of the period. The supporting indicator, change in land tenure, aimed to provide insights

[24] Various indicators were originally considered for inclusion in the study but were eliminated during pretesting. Among these were gender division of labour (human capital), tree coverage on coffee plantation (natural capital), households and hired labour inputs for coffee production (financial capital), and changes in food consumption (vulnerability). In some cases, inclusion of these indicators extended the interview duration to a point that was unmanageable. In most cases, secondary information provided insights into these indicators (e.g., tree coverage).

into potential reasons for changes (or lack thereof) in land area or in area under coffee production.

- *Human capital*: Indicators for human capital focused on whether households were able to acquire new knowledge for agricultural production during the assessment period. The four primary indicators included: 1) new skills for enhanced coffee quality, 2) new skills for pest and disease control, 3) application of good production practices in coffee, and 4) new skills for production of products other than coffee. Data on new skills for enhancing coffee quality and for pest and disease control in coffee production were obtained by asking households about relevant production practices at the beginning of the assessment period (or prior to joining Soppexcca, whichever came first), and at the end of the assessment period. It was not possible to observe skills for implementation of good production practices in coffee. Nor was it possible to ask households to describe their production practices and expect responses of sufficient detail or reliability to assess changes. Thus, the following proxy was applied only among those households that did not apply purchased fertilizers: ability to reach an average productivity of 1,000 lbs/year/manzana[25] in coffee production. By applying the indicator only to households that did not apply purchased fertilizers, the effects of fertilizer application of productivity were controlled. When productivity levels averaged more than 1,000 lbs/year/manzana it was assumed that these households used good production techniques and that these techniques were acquired during the assessment period[26]. When households failed to reach an average productivity in coffee of 1,000 lbs/year/manzana it was deduced that they did not acquire new knowledge for application of good production techniques. The final primary indicator focused on new knowledge for the production agricultural products that had not been produced prior to the assessment period. The two supporting indicators aimed to shed light on potential reasons households did or did not acquire or implement new knowledge for coffee production, focusing on 1) the role of technical assistance (from a household perspective) and 2) the effects of the loss of the male household head.

[25] *Manzana* (mz) is the traditional unit of land measure in Nicaragua: 1 mz is equal to 1.73 acres and 0.69 ha.

[26] Households that did not apply chemical fertilizers but did apply good production practices can achieve between 1,000 and 1,600 lbs/year/manzana of parchment coffee (J. Hagger, pers. comm.). Alternatively, households that do not apply chemical inputs or good production practices have productive levels that do not exceed 1,000 lbs of parchment coffee/year/manzana. At higher levels of productivity, these assumptions would not hold, as the number of productivity-influencing factors, such as synthetic fertilizers, increases.

- *Social capital*: The three primary social capital indicators aimed to understand changes in the trust and reciprocity embedded in coffee trading relationships. Information on the nature of relationships was obtained by asking households to identify buyers and the services that they offered in the year prior to the assessment period (or prior to joining Soppexcca, whichever came first) and at the final year of the period. Households also provided their perceptions of their benefits and solidarity with Soppexcca. Information on number of bags of coffee sold to Soppexcca (versus other coffee buyers) was obtained for the final two years of the assessment period. The third indicator addressed changes in access to other services (e.g., health services, credit) through coffee-buying relationships. Households provided information on services received before and during the assessment period.
- *Physical capital*: The three primary indicators for physical capital included 1) expansion or improvement of wet-milling infrastructure, 2) expansion or improvement of machinery, equipment and tools, and expansion or improvement of housing infrastructure. Because of the infrequency and the relatively high costs, a five-year recall period was used. Among the types of machinery, equipment, tools and infrastructure considered were motorized pumps, motorized sprayers, wet mills, and coffee depulpers. The housing infrastructure indicators addressed changes in flooring, roofing, and walls,[27] while the major consumer durables indicator addressed changes in access to a second home (usually near an urban centre) and motorcycle/vehicle ownership, and major consumer electronics.
- *Financial capital*: The two primary indicators for financial capital include price and coffee benefits from participation in value chains for certified coffee and 2) change in access to short- and long-term credit. Price and income benefits were calculated for the five-year assessment period, based on price data provided by households and key informants and secondary information on prices in international coffee markets. Households provided information on their access to short- and long-term credit during the five-year assessment period. A database on credit repayment provided insights into the ability of households to repay their credit obligations to Soppexcca.

[27] The importance of housing infrastructure on overall livelihood security is highlighted by Cattaneo et al. (2007). In Mexico, they found that replacing dirt floors with cement floors significantly improved the health of children. Specifically, they found that a complete substitution of dirt floors by cement floors in a house led to a 78% reduction in parasitic infestations, 49% reduction in diarrhea, 81% reduction in anemia and a 36% to 96% improvement in cognitive development. Additionally, they find that replacing dirt floors with cement floors significantly improved adult welfare, as measured by increased satisfaction with their housing and quality of life, as well as significantly lower rates of depression.

Table 4. Indicators of asset building at the household level

Capital	Primary indicators	Supporting indicators	Data collection methods
Natural capital	• Change in area under agricultural production • Change in area under coffee production • Change in fertilizer usage for coffee (proxy for soil fertility) • Change in disposal of wastewater and herbicide usage for coffee (proxies for environmental health)	• Change in land tenure	• Household interviews • Key informant interviews
Human capital	• New skills for enhanced coffee quality • Ability to reach productivity of more than 1,000 lbs/year/ manzana, applied only to households that did not apply purchased fertilizer (proxy for application of good production practices in coffee) • New skills for production of products other than coffee • New skills for pest and disease control in coffee	• Perceptions on utility of technical assistance • Change in household composition (loss of male household head)	• Household interviews • Key informant interviews
Social capital	• Change in relationships with coffee buyers • Coffee sold to coffee buyers other than Soppexcca • Change in access to other services and safety nets (e.g., emergency credit, scholarships, health services[9]		• Household interviews • Key informant interviews
Physical capital	• Expansion/ improvement of wet-milling infrastructure[28] • Expansion/ improvement of machinery, equipment, tools • Expansion/ improvement of housing infrastructure		• Household interviews
Financial capital	• Price and income benefits from participation in certified coffee value chains • Change in access to short and long-term credit	• Ability to repay credit obligations	• Household interviews • Database on credit repayment

[28] During wet milling the pulp is removed mechanically with a depulper, and the depulped coffee is fermented to remove the mucilage. Water is used copiously throughout the process. According to Brando (2004), wet-processing consumes from 20 m^3 to 100 m^3 of water/ton of green coffee, with the lower end of the range achieved through recycling. Ecological wet milling utilizes less than 10 m^3, ideally under 5 m^3 of water/ton of green coffee.

4.4 Data analysis

The indicators for the household questionnaire generated multiple perspectives on changes in asset endowments over the assessment period. Some indicators generated information that was amenable to conventional quantitative analytical techniques, while others generated information that were better suited to qualitative analysis. Qualitative data from the household interviews were analysed in an interpretative manner. The quantitative data were explored by generating descriptive statistics (means, standard deviation, medians, minimum and maximum values) and later by means of different bivariant and multivariant tests and analyses. Qualitative and quantitative data from household surveys were entered into an MS Access database and analysed using SPSS (Statistical Package for Social Sciences) and MS Excel.

Two levels of reductionism were applied to determine changes in asset building at the household level. A high level of reductionism provided insights into major trends in the sample regarding asset building. In this way, it provided a general measure of the overall impact of the interventions (e.g., Carter and Barrett 2004; Booysen et al. 2008). An asset index was created using principal components analysis to assess asset building from a high level of reductionism. However, understanding the relevance of asset building for livelihood security and the role of the intervention in bringing about these changes required a lower level of reductionism. This was achieved through detailed quantitative and qualitative analysis at the level of each indicator. The following text provides a brief outline of the analytical tools and techniques used in this research.

4.4.1 Quantitative data analysis

Various tools, described below, were used to analyse the quantitative data generated from the household level survey. Among these tools, cluster analysis was especially important, as it provided the framework for analysis of the experiences in asset building at the household level.

Principal components analysis

Principal components analysis (PCA) provides a robust option for estimating an asset index, which allows for understanding macro changes in asset endowments. PCA sets the stage for the most detailed analysis of asset building that is the backbone of this research.

PCA overcomes the lack of cardinality and fungibility that are inherent in asset-based measures of poverty (Filmer and Pritchett 2001). PCA is a technique for extracting from a large number of variables the few orthogonal linear combinations of the variables that best capture the common information. The first principal component is the linear index of variables with the largest amount of information common to all of the variables.

The result of principal components is an asset index for each household (Aj) based on the formula:

$$A_j = f_1 \times (a_{j1} - a_1) / (s_1) + \ldots + f_N \times (a_{jN} - a_N) / (S_N)$$

where f_1 is the scoring factor for the first asset as determined by the procedure, a_{j1} is the j_{th} household's value for the first asset and a_1 and s_1 are the mean and standard deviation of the first asset variable over all households. A basic assumption is that a household's long-run wealth is what causes the most common variation in asset variables. To measure asset building over time, an asset index can be computed for two time periods using the same indicator (Garip 2010). The intuition underlying this method is that a latent (unobservable) variable for each type of capital manifests itself through ownership of the different assets. Moser and Felton (2007) argued that PCA is appealing for combining variables because it is technically equivalent to a rotation of the dimensional axes, such that the variance from the observations was minimized. It is similar to a regression in terms of minimizing residuals, but in this case the residuals are measured against all of the variables, not just one dependent variable.

PCA is also useful because its coefficients have an intuitive interpretation. The coefficient on any one variable is related to how much information it provides about the other variables. If ownership of one type of asset is highly indicative of ownership of other assets, then it receives a positive coefficient. If ownership of an asset contains almost no information about what other assets the household owns (its correlation coefficient is near zero), then it receives a coefficient near zero. And if ownership of an asset indicates that a household is likely to own few other assets, then it receives a negative coefficient. A higher or lower coefficient means that ownership of that asset conveys more or less information about the other assets. According to Filmer and Pritchett (1994), such an asset index does well in three dimensions: first, it is internally coherent and produces clear separations across the poor, middle, and rich households for each asset individually; second, it is robust to the assets included; and third it produces reasonable comparison with other conventional poverty measures.

Various studies have applied an asset index for assessing asset-poverty conditions (e.g., Filmer and Pritchett 2001; Moser and Felton 2007; Garip 2010).

Asset indicators have tended to be highly rudimentary in nature: for example, number of cows, number of TVs, or whether a house has windows or a gas stove. In the context of this research, more complex indicators related to productive assets will be applied to the PCA (rather than a focus solely on consumption-related indicators).

Cluster analysis

Cluster analysis a key analytical element in this research. It allows for the segmentation of households based on key elements of their livelihood strategies and their asset endowment. This, in turn, provides a more nuanced understanding of their experiences in asset building. Research that examines asset building in response to development interventions has tended not to distinguish among different household types (e.g., Adato and Meinzen-Dick 2007). In addressing this gap, this research applies cluster analysis to group sampled households according to major assets (e.g., landholdings) and key elements of livelihood strategies.

The cluster was formulated using a two-step clustering technique in SPSS.[29] Simulation research has suggested the two-step procedure is effective at reproducing "true" clusters (SPSS 2007). As a general rule, two-step cluster analysis requires a minimum of about 200 observations to get a reliable solution (Salimath, Cullen, and Umesh 2008), which was the case here. Initially, several continuous and binary variables were considered for clustering, some related to assets (e.g., total area, area under coffee production, and income earned off-farm) and others to household characteristics (e.g., age of the household member registered with Soppexcca, single-headed household, total household size, and highest education level achieved). However, an examination of the correlation matrix between these variables showed a low number of correlations with at least medium size (i.e., >.30). This suggested the complexity, with many different factors and factor combinations influencing the independent variables.

The solution to this problem was the incorporation of a reduced number of variables that offered higher correlations between them. The following two variables were selected: 1) area under coffee production in 2008–2009 and 2) percentage of total household income derived from off-farm sources in 2008.[30] A four-cluster solution emerged from this analysis, which was later reduced to three based on

[29] The two-step clustering algorithm in SPSS contains two stages: 1) preclustering and 2) hierarchical clustering. The precluster stage groups the respondents into several small clusters. The cluster stage uses the small clusters as input and groups them into larger clusters.

[30] Alternatively, data from the 2004–2005 coffee production year (the beginning of the assessment period) would have been used to define the clusters. However, it was not feasible to collect detailed information on income sources for this year based on recall alone. This situation, combined with the lack of baseline data, necessitated use of income information from the 2008–2009 production year. While information on area under coffee production for the 2004–2005 production year was available, information from 2008–2009 was used, thus allowing for a match with the information on income.

insights into the sample. Clustering carried out on the data at the end of the assessment period, rather than at the beginning, does not have any pre-identifiable negative implication for the analysis.

Tools for identifying changes, exploring correlation, and prediction

Various other statistical tools used to identify changes in assets and the factors that contributed to the changes. Quantitative data included mainly nominal and interval data. These data were explored by producing descriptive statistics (frequencies, means, standard deviations, medians, minimum and maximum values) and graphic outputs (scatter plots and histograms), and later by bivariate and multivariate tests and estimation procedures. Logistic regression was employed to predict the effect of multiple variables on a household's ability to accumulate a given asset (e.g., land for agricultural production). Analysis of variance (ANOVA) was employed on various occasions for identifying differences in a given asset across the three clusters. Among the tests used for understanding correlation were Pearson's Product Moment Coefficient, or Person's *r* (a measure of the strength and the direction of an association between variables) and t-test (a test to compare the difference in the means of values of the dependent variable of two unrelated samples). In general, these tools provided support to understanding the changes that took place and the relationships between the changes in assets and various independence variables. They cannot explain how or why the changes took place or the correlations between variables. Questions of how and why the changes took place were addressed based on an understanding of the context from which the variables were taken and qualitative information from stakeholders.

4.4.2 Qualitative data analysis

Preliminary analysis consisted in reviewing and sorting the qualitative information according to relevance to a particular asset at the enterprise and household levels. Data from key informant interviews, observation, household surveys, and secondary information were analysed according to each of the dimensions highlighted in the respective conceptual framework. This allowed for assessing the potential of the various interventions, as well as identifying those elements that could have increased this potential. Inductive analysis was used to capture the patterns, themes, and categories that emerged out of the data (Patton 1980). Inductive analysis provided insights across the asset indicators regarding the relevance of the identified changes for household productive capacity and well-being. For example, inductive analysis was used to identify variations in the relevance of technical assistance for coffee

production and noncoffee-related services provided by Soppexcca for different types of Soppexcca members. At the level of upstream enterprise, inductive analysis from key informant interviews provided insights into changes (or lack thereof) of certain indicators for social capital and human capital.

4.5 Strengths and limitations of methodological framework

The methodological framework outlined here presents strengths and limitations for responding to the research questions and conceptual framework. The following strengths are recognized:

- Variations in the level of reductionism in data analysis provide a more complete picture of asset building than typically provided in the literature. The use of an asset index allows for general insights into changes in asset endowments over time at the household level. Detailed and extensive household-level data collection allows for understanding why the changes took place and the relevance of the changes for livelihoods security.
- The use of between three and four indicators for each capital at the upstream enterprise and household levels allow for deep insights into the nature of changes. Indicators focused on changes in asset endowments in response to the value chain development interventions, rather than on outputs of the interventions (e.g., participation in training events).
- The segmentation of households by cluster membership makes possible discussions on the differences in preexisting asset endowments and on differences in changes in endowments in response to the interventions.

The limitations of the framework deal with the complexity in data collection and analysis. By including various indicators for a given capital asset, analysis confronts the possibility of ambiguous results for a given capital asset. Without the use of control groups and with missing information at the household level, the ability to separate out the effects of the interventions for value chain development from the context can be inconclusive. The challenges related to the complexity of the data collection were addressed through a prolonged period of fieldwork in Nicaragua, extensive training and supervision of data collection assistants, and the use of multiple data collection methods.

5 Asset building by the coffee cooperative Soppexcca

5.1 Introduction

This chapter examines changes in productive assets of the coffee cooperative Soppexcca and the extent to which these changes led to improved business viability. During the assessment period (2004–2005 and 2008–2009), NGOs, projects, and non-for-profit lending organizations provided technical and financial support to Soppexcca (see chapter 1). Much of this support aimed to address the negative implications of the coffee crisis through the building of relationships in certified coffee markets. Support from the private sector included services that were embedded in trading relationships for coffee, such as no-interest advance payments on coffee purchases. As detailed in the following discussions, Soppexcca achieved major advances in asset building and these interventions played a pivotal role in building Soppexcca's capacity to respond to buyers' demands and market-related shocks. However, results also show that important gaps remain and that addressing these gaps implies changes in how Soppexcca operates and in how interventions for value chain development are design and assessed.

5.2 Asset building by Soppexcca

This section discusses changes in Soppexcca's endowments of capital assets during the assessment period. Analysis focuses on four capitals: human, social, physical, and financial. Because Soppexcca does not directly engage in coffee production, matters of natural capital are covered only at the household level (see chapter 6).

5.2.1 Changes in human capital endowment

This section evaluates changes in skills and capacities of Soppexcca's administrative staff to 1) sustain relations with buyers, NGOs, and member households and 2) provide effective technical assistance to members. It also examines the skills and capacities of Soppexcca's elected leaders (from producing households) to contribute to Soppexcca's governance.

Skills and capacities for sustaining relations with buyers and NGOs

Before the assessment period, Soppexcca had achieved a notable ability to engage buyers for the purchase and selling of coffee and involve NGOs to design collaboration for supporting smallholder producers. These abilities were due, in large part, to the long-term presence of its professional manager, Fatima Ismael. The initial selection of Ms. Ismael was agreed upon by the debt-holding coffee buyers, and her

salary during her first years of service was covered by Max Havelaar—a Netherlands-based fair-trade promotion organization. Since the beginning of Soppexcca, she has been responsible for strategic planning (including the purchase of the dry-processing plant), as well as day-to-day management, including decisions on short- and long-term credit assignment, emergency credit allocation, buyer negotiations and coordination, and NGO relations. All the coffee buyers interviewed for this study expressed their unconditional trust in Soppexcca's professional management. However, they also mentioned how communication stopped when Fatima was out of contact and that the overall costs of coordination with Soppexcca were high (due to information and communication blackouts).

During the coffee crisis, NGOs sought out Soppexcca for collaboration in building the capacities of coffee-farming households to participate in value chains for certified coffee. Soppexcca built up their administrative structures for managing NGO-financed activities during this period. Long-term relationships with NGOs such as Christian Aid and LRW reflected their achievements in this area. On the other hand, observation of the interactions between LRW and Soppexcca during fieldwork for this research highlighted LRW's difficulty in obtaining timely information from Soppexcca to comply with its donor reporting requirements. There too, information blackouts were common, best resolved through repeated and frequent visits by LWR staff to Soppexcca offices. Soppexcca appeared to struggle with managing the information demands by buyers and NGOs, in addition to the information needed to run their business. During the period of data collection, no fewer than three assessments (in addition to this one) were being carried out on the impacts of certification and the impacts of specific project interventions. Evidence suggests that while Soppexcca has the skill, it may lack the capacity to manage effectively the demands placed on it by buyers, NGOs and other service providers and by members.

Skills and capacities to provide technical assistance

Soppexcca's human capacity to provide technical assistance expanded markedly during the assessment period but remained dangerously dependent on external support. Prior to 2006, Soppexcca's extension staff consisted of two persons. In 2007, project funds allowed expansion to seven persons. Despite the increase in staff, their overall capacity to provide technical assistance was limited by the number of activities that they carry out. Extensionists were charged with assisting households in coffee production and postharvest management, estimating and monitoring coffee production for the credit department, and participating in and carrying out training on a various subjects (e.g., gender promotion, cocoa production, depending on the

project financing the training. Each extensionist was assigned to between one and three base cooperatives. The salaries of all extensionists were covered entirely with project funds. At the time of data collection for this study, the renewal of contracts for five extensionists was in jeopardy, subject to new sources of funding.

Evidence from household and key informant interviews suggested that extensionists were not equipped with the incentives, tools or training to address the farm-level production problems of resource-poor households. Among the concerns expressed by Soppexcca's lead extensionist, Rigoberto Pineda, were overburdened staff (each extensionist with 60–70 households), limited ability to target assistance to households based on need, lack of coordination between technical assistance and the credit department, low motivation and limited skills of extensionists (three were fired in 2009 for low performance or unprofessional behaviour), tendency to provide recommendations with limited understanding of the coffee plantation, and limitations to empathize and communicate effectively with producers. At the household level, Soppexcca members commonly pointed to a lack of attention and limited capacity to identify appropriate solutions to production problems as deficiencies of the Soppexcca extension program (see chapter 6 for details).

Developing and retaining qualified staff was a problem. In general, the insecure contractual situation (with salaries for extensionists entirely dependent on external project funds) was identified by extensionists during interviews as a major source of concern. In 2008, three extensionists were dismissed for poor performance. In 2009, a newly hired extensionist, Bayardo Gadea Centeno, was murdered in an attempted robbery while returning from a base-cooperative training event. Investments in rigorous on-the-job training that would improve working with asset-poor farming households as well as investments in staff retention and personal security have eluded Soppexcca and its supporters .

Skills and capacities of Soppexcca's elected leaders

The final indicator examines the skills and capacities of Soppexcca's elected leaders to shape Soppexcca's operational and strategic decision-making processes and provide oversight of the operations. Elected leaders first became part of Soppexcca's organizational structure in 2004 when it converted to the cooperative business. Evidence collected for this study suggested that, in general, since 2004 Soppexcca achieved mixed results in empowering its elected leaders. On one hand, a board of directors has been in place and operating since 2004, based on tested election procedures. The board meets regularly at Soppexcca to discuss strategic and operational decisions, such as relations with buyers, credit providers, and NGOs and

setting prices for Soppexcca-provided credit. However, evidence also suggested that the board faced serious limitations to carry out its duties fully and effectively. One reason for this was a lack of information on the strategic objectives of Soppexcca or its financial status. Two key informants, both with leadership roles on the board of directors in 2009, noted that they had no information on the strategic plan and that they had not been able to access up-to-date and usable information on the financial status of Soppexcca. They attributed the lack of financial information to weaknesses in Soppexcca's administrative department. However, even had they had the necessary financial information, evidence suggests that they would not have been able to use it to carry out their duties. According to a former member of the Oversight Committee (Junta de Vigilancia), whose role it was to oversee financial affairs, during the first two years of this three-year term, he did not understand how to interpret financial statements. It was not until the final year of this term that he consulted with an externally hired accountant to review in detail the financial statements. He was replaced after his third year of service.

5.2.2 Changes in social capital endowment

The nature and strength of Soppexcca's relationships with its buyers and its members provides the basis for analysis of social capital endowment. The relationship between Soppexcca and its members involves two factors: 1) the exchange of goods and services and 2) members' involvement in Soppexcca's governance. The latter factor is assessed here, while the exchange of goods and services is assessed in chapter 6. Key informant interviews with Soppexcca's staff, elected leaders, and coffee buyers provided the information for assessment.

Relationships with buyers

The 2008–2009 harvest was sold to seven buyers: five from Europe, which purchased 59% of the total volume exported, and two from the United States, which purchased the remaining 41%. The five European buyers had purchased roughly the same amount of coffee (usually between one and two containers per year) from Soppexcca every year since 1999—the year that Soppexcca first exported coffee after Jiprocoop's collapse. US buyers began to purchase coffee from Soppexcca in significant volumes in the 2003–2004 harvest. The addition of the US buyers followed a period of rapid expansion in Soppexcca membership,[31] which allowed for increased

[31] Between 2002 and 2006, Soppexcca membership increased by more than 200%, from 150 to 500. This was due, in part, to the coffee crisis (with households seeking better marketing opportunities), and by Soppexcca's efforts to support households with newly acquired rights over their land (see discussion on natural capital in section 4.4).

export volumes. Interviews with European buyers suggested that strong links with Soppexcca existed before the assessment period, due initially to Soppexcca's commitment to repay the debt left behind by Jiprocoop. Effective professional management and compliance with contractual terms reinforced this initial trust over time. None of the interviewed buyers reported major problems over the duration of their relationship with Soppexcca with respect to the quality of coffee delivered or with compliance with contractual terms (including repayment of prefinancing). One buyer regarded Soppexcca as the most reliable among the 10 cooperatives in Latin America from which it purchases coffee.

Buyers were asked to identify problems encountered in their communication and coordination with Soppexcca during their business relationship. Responses indicated that relationships exhibited unusually high levels of trust, on the one hand, and frustration at the inefficiency of communications and apprehension regarding Soppexcca's viability, on the other. As mentioned previously, strong trust with European buyers was based on Soppexcca's willingness (and that of its members) to assume the debt of Jiprocoop, reinforced over the years by competent management. According to one buyer, "We feel a special trust with Soppexcca. They kept paying off the debt even though they didn't have to." Trust was reflected in tangible ways. For example, when Soppexcca expressed concerns about its difficulty to capture its members' coffee due to high levels of local competition during the harvest season, interviewed buyers agreed to adjust their price formula so that prices offered by Soppexcca were more in line with local prices.[32] Another buyer noted that "if Soppexcca has to request an adjustment in their price, then there is always a good and transparent reason."

However, communication and coordination from the buyers' perspective remained underdeveloped at the end of the assessment period. Buyers reported communication blackouts when Soppexcca experienced problems with delivery of a container. In some cases, lack of information about delays left buyers unprepared for the arrival of containers before the arrival of the shipping documentation (thus, resulting in port charges incurred by the buyer). Communication tended to suffer when Ms. Ismael was away from her office. "It is very hard to get communication from other Soppexcca staff; communication is very much focused on Fatima," noted one buyer. Given the risky nature of coffee production (especially as related to changes in climate and changes in local marketing conditions), efficient and useful

[32] Rather than base the price on the New York price for coffee six to eight weeks prior to delivery, the price was based on the four-month-average New York price between December and March, when coffee producers make decisions about where to sell their coffee. This is also a period when international coffee prices are generally highest during the year.

communication is prized by buyers. In one case, buyers make an annual trip to Soppexcca's office to get the information they need on expected production volumes and local marketing conditions. Information collected also provided the buyer with inputs for the promotion of their product in Europe. The buyer added, "We would prefer that the information we need were provided in a less costly manner, but we have learned to adjust to the situation." While overall confidence in Soppexcca by its buyers was exceptionally high prior to and during the assessment period, buyers expressed concern about the durability of their relationship with Soppexcca, especially as related to the high concentration of responsibility in Soppexcca's manager. As stated by one buyer, "What would happen if Fatima left? It would be hard to understand the change in our relationship with Soppexcca if she left." She went on to add, "We want and need more people in Soppexcca that we can rely on."

Members' involvement in Soppexcca's governance

In 2004, the Soppexcca Board of Directors met for the first time. To what extent has the board been able to make meaningful contributions to Soppexcca's governance? Evidence during the assessment period indicates that the board faced major challenges in effective governance. The main reasons were insufficient skills and lack of information. One board member noted that she received no training in basic business or in cooperative management prior to assuming her post. She claimed that during her entire period on the board she had little understanding of how the farm-gate price was calculated by Soppexcca or of the contract price for coffee between Soppexcca and its European and US buyers. What skills and knowledge she acquired while on the board were acquired through trial and error—a potentially effective yet costly approach to building human and social capital. A similar experience was reported by a former member of the Oversight Committee. Informants noted that the board and the Oversight Committee generally did not have access to timely financial information, largely because of the lack of information rather than inaccessibility of information.

Interviews highlighted the board's reluctance to question, debate, or probe Soppexcca's management in strategic decisions and investments. For example, according to one source, there was no debate or request for additional information on the issue of Soppexcca's investment in the dry-processing plant (see discussion below on physical capital). According to one former board member, "Any effort to discuss the decentralization of Soppexcca's administration drew criticism from the other board members because it was perceived to show a lack of respect for Fatima." Interviews with former board members also indicated that the board did not set the

agenda for its meetings; rather management set the agenda, with no up-front consultation.

5.2.3 Changes in physical capital endowment

Notable additions to Soppexcca's physical capital took place during the assessment period. Soppexcca began the period with a warehouse that housed the administrative and technical staff and was where coffee was received and stored (fig. 5). Bilateral donors provided grants to construct the warehouse. By the end of the assessment period, Soppexcca had made the following additions to its endowment of physical capital:

- Field offices: Eleven offices were constructed in 2008 with project funds. They provide an office and housing for Soppexcca extensionists and space for meetings, training, and the storage of parchment coffee prior to delivery to Soppexcca. The offices were not equipped with communication equipment, and in most cases were not connected to power or telephone grids.
- Cupping lab: Soppexcca constructed a cupping lab in 2005 with financial assistance from an NGO and a US coffee buyer. In general, donor strategies considered cupping labs important as a tool for responding to the coffee crisis—they were thought to allow cooperatives greater ability to increase their bargaining power vis-à-vis buyers and to implement internal quality control procedures.
- Cafés in Jinotega: In 2007, in an effort to add increased value to green coffee, Soppexcca constructed two cafés in Jinotega, one located within Soppexcca's office and the other at the central plaza in Jinotega. Both sold prepared coffee drinks and roasted, packaged coffee and pastries. The cafés provided employment and skill-building opportunities for a small staff derived from Soppexcca's membership population.
- Fertilizer production facility: In 2008, the facility was constructed for the production of chicken-manure fertilizer. This plant aimed to reduce Soppexcca's dependence on Biogreen and provide for an additional source of operating funds for Soppexcca. As of 2009, however, the plant had not begun to produce fertilizer due to the uncertainty surrounding the use of chicken mature as a nitrogen source for the production of organic coffee.
- Dry-processing plant: Prior to 2009, Soppexcca used third-party services for dry processing of parchment coffee (necessary for the conversion of parchment coffee to green coffee). The mill was owned by another

organically certified coffee cooperative. However, over the years, various concerns emerged over the relationship with the processing mill, including: 1) restricted access to facilities during the harvest season (when demand peaked) and 2) perceptions that the mill mixed coffees (thus diluting quality). In 2008, Soppexcca purchased its own plant at a cost of US$614,344, using. US$119,344 of its own funds. These funds were derived from 1) use of the social premium from the sale of fair trade coffee and the difference between the price Soppexcca received for coffee from its buyers and the price paid out to growers. A long-term loan from an US-based lending organization provided US$280,000 and NGOs donated the remaining US$215,000. In 2009, US$10,000 were invested by Soppexcca in upgrading facilities and equipment, thus allowing the plant to be become operational in 2009. Soppexcca estimates that future investments over the next five years will total US$288,500.[33] In addition to addressing the negative perceptions of third-party processing, Soppexcca ownership of a dry-processing plant was expected to generate operating income: Soppexcca's membership supplied only about 40% of the plant's maximum capacity of 2,500 MT of parchment coffee per year. ,

- Other equipment: Between 2003 and 2009 Soppexcca acquired additional equipment such as trucks, computers, and office equipment, mainly with grants from project funds.

Grants from bilateral donors were essential for the building of Soppexcca's physical capital. From the perspective of both donors, such investments were in line with their strategy for increasing the competitiveness of the Central America coffee sector in terms of improved quality and increased value added. For Soppexcca, these investments allowed it to increase the range of services that it offered to its members (and thus, its income generating potential). It is not possible to predict the extent to which members will ultimately benefit from investments in the dry-processing plant. This will depend on factors both internal to Soppexcca (e.g., ability to operative and improve mill) and external factors (e.g., future collaboration with civil society and external demand for processing services).

[33] These expenses include: construction of a warehouse exclusively for organic coffee (US$120,000; 4-mz drying patio (US$52,000); level drying patios (US$12,000); vehicle for internal coffee transport (US$25,000); construction of industrial area for roasting, milling, and packaging (US$30,000); fences for drying patios (US$25,000); cafeteria for workers (US$18,000); illumination of drying patios (US$6,000).

Fig. 5. Soppexcca warehouse and administrative office, Jinotega

5.2.4 Changes in financial capital endowment

To appreciate how far Soppexcca advanced in financial capital endowments over the assessment period, a brief reminder of its financial capital endowments at the start of the period is useful. In the late 1990s, Soppexcca emerged from the ashes of its predecessor organization US$722,991 in debt. At the start of the assessment period, Soppexcca still had roughly US$450,000 in outstanding debt. Moreover, it had little to offer its members in terms of short-term credit—critical for the purchase of fertilizer and for carrying out coffee tree maintenance. By 2008, however, Soppexcca had paid off its debt, expanded its short-term credit portfolio to approximately US$300,000, and provided long-term credit to its members—a service that few coffee cooperatives or other coffee buyers in Nicaragua were able to provide. This section discusses how these changes were possible and addresses the remaining major challenges faced by Soppexcca's for further building its financial capital endowments.

Two factors played a major role in Soppexcca's ability to pay the inherited debt from Jiprocoop. First, sales of coffee increased significantly during the 2000s, on average, by 25% per year between 2001–2001 and 2007–2008 (table 5). Not only did sales increase but Soppexcca diversified its market outlets, making a significant inroad into the US market. The other contributing factor was the willingness of Soppexcca-affiliated household producers to accept reduced coffee prices during the period between 2000–2001 and 2007–08. Producers relinquished 50% of the premium obtained from their participation in certified fair-trade coffee markets during these years. For example, if the average New York price for coffee from Nicaragua was US$100, and the price obtained by Soppexcca from a certified coffee buyer was

US$130, US$15 dollars was applied to reduce the debt and US$15 remained with the producer. This arrangement required a major sacrifice on the part of producing households over numerous years, as well as a high level of commitment to Soppexcca by the debt-holding coffee buyers. In return for their contributions to debt reduction, Soppexcca-affiliated households received no additional services, other than the continued existence of Soppexcca.

Table 5. Sales by Soppexcca (100-lbs green coffee), 2000–2001 to 2007–2008

Production year	Exports to EU buyers	Exports to US buyers	Total exports	Sales in local market	Total sales	% increase
2000–2001	3,750	0	3,750	130	3,880	
2001–2002	4,800	0	4,800	40	4,840	24.7
2002–2003	5,560	760	6,320	60	6,380	31.8
2003–2004	7,654	2,766	10,420	430	10,850	70.1
2004–2005	11,920	2,074	13,994	148	14,142	30.3
2005–2006	7,303	2,117	9,420	2,151	11,571	-18.2
2006–2007	6,175	1,560	7,735	60	7,795	-32.6
2007–2008	7,595	5,204	12,799	365	13,164	68.9
Total	54,757	14,481	69,238	3,384	72,622	

Soppexcca's income sources from services provided to members are a charge of US$2 per 100-lb sack of coffee exported and interest from short- and long-term credit. Project funds provided restricted income for technical assistance and other activities. When fees and project funds were not available to cover costs, Soppexcca accessed funds from the sale of coffee to finance its operations. However, to the extent that it provided services that most private sector agents in Nicaragua were unable or willing to provide (technical assistance, long-term credit, social services), Soppexcca was placed at a disadvantage to other coffee buyers, which offered prices similar to those offered by Soppexcca without the additional costs. Usable information on Soppexcca's financial status did not exist. However, with information Soppexcca provided on coffee sales and contract prices, as well as information provided by key informants on grower payments and export and processing expenses, it is possible to estimate income available to Soppexcca for covering the administration and office-related exports, capital investments, interest payments, and debt reduction. Table 6 shows that estimated income (after paying expenses to growers, export, and processing) totalled US$971,480 during the eight-year period. This equates to an average of US$121,435/year. Given that so much of Soppexcca's earning were channelled into repaying the debt, relatively little was available for covering salaries and capital investments. Key informants confirmed that much of Soppexcca's administration costs were covered with project funds. Given the recent major investments in the dry-processing mill, it is unlikely that Soppexcca will

be able to operate without continued subsidies from NGOs and projects for the midterm.

Table 6. Income and expenses from the sale of conventional and organically certified coffee by Soppexcca, 2000–2001 to 2007–2008

	Total sales (100-lbs green coffee)	Weighted average price for green coffee (US$)	Total income (US$)	Purchase of coffee from growers (US$)	Export and processing expenses	Income after grower, export and processing expenses
Conventional						
2000–2001	1,800	83.12	149,613	111,600	20,664	17,349
2001–2002	3,880	87.64	340,048	232,800	44,542	62,706
2002–2003	5,076	72.46	367,792	314,712	58,272	-5,192
2003–2004	10,024	112.29	1,125,578	651,560	115,076	358,942
2004–2005	12,242	118.45	1,450,026	1,224,200	140,538	85,288
2005–2006	9,594	133.19	1,277,760	1,160,840	110,136	6,784
2006–2007	5,935	136.10	807,770	718,135	68,134	21,501
2007–2008	10,155	159.46	1,619,340	1,320,150	116,579	182,611
Total	58,706		7,137,927	5,733,997	673,941	729,989
Organically certified						
2000–2001	0	0	0	0	0	0
2001–2002	380	136.00	51,680	23,560	4,364	23,756
2002–2003	1,304	137.09	178,764	80,848	14,972	82,944
2003–2004	826	136.00	112,336	70,210	9,484	32,642
2004–2005	1,900	145.60	276,640	235,600	21,814	19,226
2005–2006	1,978	149.00	294,648	237,300	22,704	34,644
2006–2007	1,860	144.66	269,060	232,500	21,355	15,205
2007–2008	3,009	172.47	518,970	451,350	34,545	33,075
Total	11,257		1,702,098	1,331,368	129,238	241,492

Source: Author's calculations, based on data provided by Soppexcca

Capitalization of credit program

Soppexcca's offer of short-term credit secures its access to parchment coffee produced by its members. Given the overall lack of affordable credit for smallholder coffee producers, access to Soppexcca's credit program provided powerful incentives for members to comply with the credit terms and to access the otherwise higher costs of doing business with Soppexcca (e.g., delayed final payment, higher quality requirements, lack of transport services). Between 2001–2002 and 2007–2008, Soppexcca achieved a major increase in the size of its short-term credit portfolio (table 7). Delinquency in payment was a major problem (see chapter 6 for discussion), largely due to 1) the use of credit for purposes other than the purchase of coffee production inputs and 2) weather, diseases, and other natural factors that resulted in major fluctuations in production from year to year. The increase in the credit portfolio was due to 1) the direct injection of funds by projects and donors for

short-term credit and 2) the transfer of funding from long-term credit to short-term credit upon repayment of long-term credit by members.

Table 7. Short-term credit (US$) distributed by Soppexcca, 2001–2002 to 2007–2008

	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008
Total credit distributed	2,116	166,573	163,309	130,099	218,614	242,916	373,672
Approximate membership	150	250	350	450	500	500	500
Mean credit	14.1	666.3	466.6	289.1	437.2	485.8	747.3

Source: Author's calculations based on data provided by Soppexcca

Long-term credit was especially critical for Soppexcca members because it allowed them to renovate their plantations (critical, in many cases, after years of neglect during the coffee crisis) and expand their coffee holdings. The ability of Soppexcca to offer long-term credit to its members appears to be rare among coffee cooperatives in Nicaragua. Among the four coffee cooperatives that were interviewed as key informants for this research, none reported the capacity to offer long-term credit to members. Soppexcca first offered long-term credit in 2002–2003. The total size of the long-term credit portfolio varied from year to year. In 2007–2008, US$83,303 was offered as long-term credit, with all of these derived from project funds. Soppexcca's ability to access funds for long-term credit reflects its strong links with NGOs during the coffee crisis. Repayments of long-term loans were channelled into the short-term credit program rather than reused to provide long-term credit. This reflected the high risks related to long-term credit provision as well as the more urgent need to secure access to parchment coffee through the provision of short-term credit.

5.3 Summary

On the surface, Soppexcca appears to be an extraordinary success, but there are important gaps and weaknesses in asset building that limit its ability to deliver tangible benefits to its membership base and make it highly vulnerable to internal and external shocks in the future.

Strong professional leadership, combined with a long-term commitment from buyers and NGOs to its development and the institutional framework provided by fair trade certification, played an important role in determining Soppexcca's ability to face down multiple crises while building up its asset base. The overall context for coffee marketing, including the coffee crisis (and expansion of membership and interest by donors in coffee cooperative development) and the high demand for specialty coffee

from Central America, allowed Soppexcca to compete head-on with local coffee buyers while offering a range of services to its members. Major limitations of human capital included the limited capacities of Soppexcca to build an effective extension program. Soppexcca learned through trial and error, which was expensive for both Soppexcca and, in some cases, for its members. Identified gaps in social capital endowments included 1) limitations for effective member participation in governance and 2) limited progress in decentralization of management responsibilities and the related risks to long-term viability. Limitations to build effective internal leadership within the cooperative resulted in a high concentration of power and information in the professional manager, hence vulnerability of the organization and all the value chain relationships. Financial capital endowments, while larger than at the start of the assessment period, were still weak and made Soppexcca highly dependent on donor funds. The fact that technical assistance was 100% financed by projects was a major concern for Soppexcca.

6 Asset building by Soppexcca-affiliated households

6.1 Introduction

This chapter explores changes in asset endowments by Soppexcca-affiliated households during the five-year period between 2004–2005 and 2008–2009. The majority of the households sampled for this study joined Soppexcca during the early 2000s, during the worst years of the coffee crisis. Thus, the 2004–2005 and 2008–2009 assessment period follows a period of rapid growth in Soppexcca's membership. It also coincides with a major increase in external support for Soppexcca's infrastructure development and credit and technical assistance programs. Moreover, during this period prices for noncertified coffee increased significantly, as well as local competition among intermediaries for raw material. The next section examines variations in asset building from a macro perspective, looking at variations among the sample in terms of preexisting assets, changes in assets during the assessment period, basic elements of livelihood strategy, and production systems (organically certified versus conventional). Each of the next five sections explores in detail changes for the indicators identified in chapter 5 for a particular capital asset (natural, human, social, physical, and financial). The final section provides a brief summary of salient findings.

6.2 A first look at asset building and potential mitigating factors

This section presents a macro perspective of the major changes in asset endowments among the coffee-growing households during the assessment period along with analysis of the potential mitigating factors, such as preexisting assets and livelihood strategies, production system, and income flows. A cluster solution is presented that aims to capture the overall potential of the sampled households to build assets during the assessment period. This cluster solution is used throughout chapters 6 and 7.

6.2.1 Macro trends in asset building

This section provides an overview of variations in preexisting asset endowments among sampled households and changes in asset endowments over the five-year assessment period. The asset index included nine indicators, with at least one indicator for each of the five livelihood capitals. Table 8 shows descriptive statistics for the indicators for 2004–2005 and 2008–2009. With the exception of productivity in

coffee and double-headed households, the mean indicator values were higher in 2008–2009 than in 2004–2005. The lower value for productivity in coffee reflected unfavourable weather conditions and related disease problems. The lower value for double-headed households reflects that membership had not expanded significantly since 2005, the average longer life expectancy for women in Nicaragua (67 for women versus 71 for men, according to WHO 2006), and either a deliberate effort by Soppexcca to include single women among its ranks and/or deliberate efforts by single women to join Soppexcca's ranks.

Table 9 displays the scoring coefficients for each of the indicators using the combined data from 2004–2005 and 2008–2009. The coefficients were derived from the first principal component provided by principal components analysis (PCA), and were used in the formulation of the asset index. Indices were computed by multiplying each indicator by the corresponding PCA coefficient and summing these values up (see chapter 4 for details). Among the higher scoring coefficients were total land area, major productive investments in production equipment, number of credit sources, and use of fertilizer. In terms of consumption, ownership of a car, motorcycle, or second home, all of which can imply dramatic changes in the quality of life for rural households, was also high. The indicator "improved flooring" scored the lowest coefficient.

Table 8. Descriptive statistics for asset indicators, 2004 and 2009 (N=292)

Productive assets	Coefficient	2004–2005	2008–2009
Ownership of a car, motorcycle, or second home (1=yes)	Mean	0.02	0.17
	SD	0.14	0.38
Improved flooring (cement or tile) (1=yes)	Mean	0.38	0.42
	SD	0.49	0.49
Total land area	Mean	6.35	6.58
	SD	10.05	9.19
Productivity in coffee (100-lb bags wet parchment/manzana)	Mean	18.67	15.29
	SD	16.10	23.67
Fertilizer usage (1=yes) (100 lb-bags complete fertilizer, urea, and /or Biogreen)	Mean	0.44	0.75
	SD	0.50	0.43
# alternative agricultural productive activities (addition to basic grains, bananas, and coffee)	Mean	0.25	0.47
	SD	0.47	0.70
# wet mill and other major production equipment/infrastructure owned	Mean	0.28	1.16
	SD	0.64	1.36
Double-headed household (1=yes)	Mean	0.90	0.83
	SD	0.30	0.38
# credit sources, both short- and long-term	Mean	0.46	2.00
	SD	0.57	0.95

Table 9. Scoring coefficients for asset indices generated by PCA

Productive asset	Scoring coefficient*
Ownership of a car, motorcycle, or second home	.537
Improved flooring (cement or tile)	.185
Productivity in coffee	.425
Total land area	.634
Fertilizer usage (1=yes)	.526
# alternative agricultural productive activities	.389
# wet mill and other major production equipment owned	.592
Double headed household	.388
# credit sources, both short and long-term	.583

* Scoring coefficient is the weight assigned to each variable (normalized by its mean and standard deviation) in the linear combination of the variables that constitute the first principal component.

Asset indices for 2004–2005 and 2008–2009 ranged from a low of -5 to a high of 5. This range captures considerable variation among the sample in terms of overall well-being and resilience. For those households with the lowest asset index, malnutrition and other signs of biting poverty (e.g., inaccessibility to medicines, limited ability to carry out agricultural production) were detected during data collection (fig. 6). On the other hand, households with the highest asset index owned considerable land that was employed in agricultural production, reared livestock in addition to coffee production, and owned motorized vehicles and homes with cement floors.

Table 10 displays the indices for 2004–2005 and changes in the indices over the course of five years. For classifying relative differences in asset endowments among the sampled households, households with an asset index between -5 and -2 were classified as poor (n=68), while those with an index of 2 to 5 were classified are rich (n=40). Households with an asset index between -1.9 and 0 were classified as medium-low wealth (n=108), while those with an asset index between .1 and 1.9 were classified as medium-high wealth (n=76). Among the households classified as poor in 2004, 28, or 42.1% of all the poor households, achieved major improvements (2+ increase in their index) in their asset indices, while 12 households, or 17.6% of all the poor households, made improvements (an income of 1 in their index). While 11 households were worse off (16.2% of all poor households), no household initially classified as poor was much worse during the period. Most of the medium-low and medium-high households showed improvement or major improvement in their asset indices in 2009, as compared to 2004–2005. Approximately 25% of the households in these two groups experienced a decline in their asset index. Richer households were most likely to have experienced a decline in their asset index over the period, often due to the division of their productive lands among family members.

In general, the asset index suggests that positive changes took place among a sizable segment of the sampled households. However, the extent to which an increase in the asset index led to improved well-being and resilience remains an open question. An asset index is too reductionist an approach to provide such insights. Only through a more detailed assessment on changes in assets can this issue be addressed. The remainder of these chapter focuses on this issue.

Fig. 6. Children with observable signs of malnutrition belonging to an asset-poor household affiliated with La Union base cooperative, Jinotega

Table 10. Change in households' asset index from 2004–-2005 to 2008–2009

2004 asset index	Major improvement*	Improvement*	Same	Worse*	Much worse**	Total
Poor households						
-5 to -3	3	0	7	0	0	10
-2.9 to -2.0	25	12	10	11	0	58
Medium-low wealth						
-1.9 to -1.0	19	12	7	11	0	49
-0.9 to 0	17	18	12	4	8	59
Medium-high wealth						
.1 to 0.9	15	6	15	5	10	51
1 to 1.9	8	3	6	2	6	25
Rich Households						
2.0 to 2.9	4	0	6	3	9	22
3 to 5	0	0	10	4	4	18
Total	91	51	73	40	37	292

* An increase or decrease in the asset index of 1 between 2004 and 2009.
** An increase or decrease in the asset index of 2 or more between 2004 and 2009.

6.2.2 Variation in asset endowments according to livelihood strategies

A clustering technique was used to identify basic elements of livelihood strategies pursued by the sampled households. Using the SPSS cluster algorithm (see chapter 4 for details), four cluster solutions were identified. However, two of the clusters were highly similar in nature; that is, they both included cases with relatively low dependence on off-farm income sources and a relatively large number of acres in coffee production. One of the clusters had 44 households and the other had nine households, with the major difference being that the land area of households in the nine-member cluster was significantly larger than that of the 44-member cluster. When both of these clusters were compared to the rest of the sample, their average land area was relatively large. Thus, a three-cluster solution was imposed, where the previous 44 and nine-member solutions were combined into a 53-member cluster. The following three clusters resulted from the analysis:

- Cluster 1 (n=77, 26.4% of sample): High dependence of income derived from off-farm sources, with relatively small area under coffee production
- Cluster 2 (n=162, 55.5% of sample): High dependence on farm-derived income and relatively small area under coffee production
- Cluster 3 (n=53, 18.2% of sample): High dependence on farm-derived income and relatively large area under coffee production.

Table 11 presents an analysis of variance (ANOVA) comparing selected indicators across the three clusters. The analysis allows for testing the validity of the clusters with respect to intergroup heterogeneity and intragroup homogeneity. In general, the cluster solution was found to be robust and was therefore used as the basis for subsequent analysis of intervention impacts and changes in capital assets. ANOVA results were generated for production-related indicators (area under coffee production, productivity) and various other indicators, including percent of total income derived from off-farm sources, single-headed household, age of household heads, and level of education achieved by the household heads.

The defining feature of cluster 3 was the relatively large size of landholdings under coffee production. The mean area under coffee production for the entire sample was 2.52 mz, with a standard deviation of 2.62. The mean value for cluster 3 was 6.36 mz. However, for most households, the area under production was considerably smaller. Clusters 1 and 2, which contain approximately 77% of the sampled households, each had an average production area of 1.67 mz. The difference between the means of the three clusters was statistically significant at the .05 level of confidence. In general, the variation within each cluster was small, with

the largest variation found in cluster 2 (1.30). The similarity in average area under coffee production between clusters 1 and 2 does not hold with respect to productivity of coffee. The average productivity for coffee—measured in pounds of wet-parchment coffee produced between 2004–2005 and 2008–2009--for households in cluster 2 was 1,830 lbs/manzana/year, which was more than twice that of households in cluster 1 (884 lbs/manzana/year). The mean value for households in cluster 3 was 2,655 lbs/manzana/year.[34] The difference between the means of the three clusters was statistically significant at the .05 level of confidence.

Table 11. ANOVA results comparing selected indicators within and across clusters

	Cluster	Mean	Standard deviation	95% confidence interval	
				Lower limit	Upper limit
Area under coffee production (manzana) 2008–2009 F (2, 290)=96.98, p<.05	1	2.15	1.44	1.82	2.28
	2	2.57	1.54	2.33	2.81
	3	9.19	6.82	7.31	11.07
	Total	2.52	2.62	3.19	4.14
Five-year average productivity, 2008–2009 to 2004–2005 (pounds/manzana of wet parchment coffee) F (2, 290)=22.71, p<..05	1	884	773	708	1,059
	2	1,830	1,699	1,567	2,094
	3	2,655	1,642	2,203	3,108
	Total	1,730	1,609	1,545	1,916
% total income derived from off farm sources 2008 F (2, 290)=692.97, p<.05	1	63.81	17.31	59.88	67.73
	2	5.90	9.82	4.37	7.42
	3	3.24	6.68	17.41	23.96
	Total	21.68	28.44	17.41	23.96
Total household size F (2, 290)=2.56, p<.10	1	5.66	2.21	4.53	5.54
	2	5.15	2.19	4.70	5.38
	3	6.00	2.23	5.16	6.39
	Total	5.17	2.21	4.92	5.43
Age of household head registered with Soppexcca F (2, 290)=2.84, p<.10	1	44.08	12.18	40.00	45.52
	2	42.02	13.30	40.56	44.69
	3	48.62	10.65	43.42	49.29
	Total	43.34	12.61	41.89	44.79
Highest level of education for household member registered with Soppexcca F (2, 290)=0.34, p>.10	1	3.61	3.76	2.58	4.28
	2	2.96	2.20	2.45	3.13
	3	3.25	2.48	2.35	3.71
	Total	3.18	2.74	2.69	3.32

The defining feature of cluster 1 is the high percentage of total household income earned from off-farm sources. Roughly 64% of their estimated annual income was derived from off-farm sources. Among the motivating factors for pursuing off-

[34] Coffee production figures related to primary production are reported in the parchment state. To convert parchment coffee to green coffee—the export state of coffee—divide by 0.50.

farm income were low productivity and fluctuating coffee prices, limited access to credit, and adverse climatic effects. Formal employment opportunities were generally limited in rural Nicaragua, and most households found employment as seasonal agricultural labourers on coffee plantations. However, not all households that depended on off-farm income were considered asset-poor. In a few cases, a high dependence on off-farm income reflected the ability to generate income from salaried employment or from other business activities, such as small-business ownership. In general, however, most households in this cluster sought out seasonal, low-skill, off-farm employment, usually in the coffee sector.

Though households in cluster 2, which made up the majority of the sample, were considered to be households with sufficient assets to avoid having to seek off-farm work, they were nonetheless struggling to sustain their livelihoods through on-farm production, given their relatively small landholdings and low productivity. This hypothesis is supported by the fact that households in cluster 2 generally had a significantly higher asset index than those in cluster 1 (table 12) at the beginning and end of the assessment period.

Household size and age of the household member affiliated with Soppexcca were used as proxies for labour input. A positive relationship was expected between household size and ability to carry out coffee production and build productive assets, ceteris paribus. Among the three clusters, the average household size varied from a high of 6 for cluster 3 to a low of 5.15 for cluster 2. Households in cluster 1 averaged 5.66 persons. These results were statistically significant at the .10 level of confidence. The higher the average age of the registered household member, the larger the preexisting levels of asset endowments (up until a certain age, after which households may begin divesting their assets). Households in cluster 3 had the highest average age, at 48 (with a standard deviation of 12.61). Households in cluster 2 had the lowest average age, at 42 (with a standard deviation of 13.30). In the middle were households in cluster 1, with an average age of 42 (with a standard deviation of 12.18). The differences between the means for age were statistically significant at the .10 level of confidence.

Table 12. ANOVA results comparing 2004–2005 and 2008–2009 asset indices across clusters

	Cluster	Mean	Standard deviation	95% confidence interval	
				Lower limit	Upper limit
2004 asset index F (2, 291)=67.29, p<.05	1	2.96	1.25	2.68	3.24
	2	4.07	1.65	3.81	4.32
	3	6.13	1.56	5.70	6,56
	Total	4.15	1.86	3.94	4.36
2009 asset index F (2, 291)=59.02, p<.05	1	3.27	1.74	2.88	3,67
	2	4.56	1.68	4.30	4.82
	3	6.57	1.70	6.10	7.04
	Total	4.59	2.01	4.35	4.82

The differences in the means for educational achievement by the Soppexcca registered household member were not statistically significant. However, the relatively high standard deviation for educational achievement for cluster 1 reflects the heterogeneity within the cluster as regards livelihoods strategies. Some 27% of the households in the cluster had no formal education, while approximately 90% of the households had less than 10 years of formal education. However, the remainder of the households had 10+ years of formal education. These households tend to work as professionals, such as teachers, skilled labour, and shopowners.

6.2.3 Variation in asset endowments according to coffee production system

An important focus of the interventions involving Soppexcca during the assessment period was the expansion of organically certified coffee production. Soppexcca offered various services to stimulate organic production, including preferential access to short- and long-term credit, subsidies for input purchases. However, the number of organically certified growers declined during the assessment period, Forty-one households identified themselves as having been organically certified but later having decided to return to conventional production practices. The majority of these households (59%) belonged to cluster 2, implying that they had relatively low asset endowments and depended on farm production for most of their income. The remaining 41% was split between households from clusters 1 and 3. Only three households were in transition to organic production in 2009.

Seventy-one sampled households carried out organic coffee production in 2008–2009. The distribution of organically certified households was roughly even across the clusters: 36% belonged to cluster 1, 20% to cluster 2, and 19% to cluster 3. Table 13 displays descriptive statistics for selected indicators according to production system, as well as the results of t-tests for equality of means. These

statistics suggest that 1) organically certified households tended to have significantly lower levels of productivity in coffee and 2) were more likely to depend on off-farm sources of income to make ends meet. Interestingly, the difference in the means for the asset index was not statistically significant. This suggests that asset building by organic producers was not diminished by their overall lower level of income (due to markedly lower productivity and limited land area). In the sections that follow, the role of Soppexcca and others in facilitating asset building by organically certified households is given special consideration.

Table 13. Descriptive statistics comparing conventional and organically certified households for 2008–2009

	Producer type	Mean	Std. Deviation
Five-year average productivity in coffee (100-lbs parchment)*	Conventional**	19.55	17.34
	Organically certified	10.32	8.04
Age of household member affiliated with Soppexcca	Conventional	44.14	13.16
	Organically certified	47.14	11.20
% income generated off-farm*	Conventional	0.18	0.27
	Organically certified	0.28	0.31
Highest level of education achieved by household member affiliated with Soppexcca	Conventional	3.08	3.01
	Organically certified	3.49	3.79
Total landholdings	Conventional	6.66	8.59
	Organically certified	7.10	10.90
Total area under coffee production	Conventional	2.54	2.70
	Organically certified	2.46	2.40
Total number of household members	Conventional	5.30	2.54
	Organically certified	5.87	2.71
Asset index (higher the index, higher the asset endowment)	Conventional	0.38	2.43
	Organically certified	-0.50	2.18

* Difference in means is statistically significant at the .05 level
** Conventional=221; organically certified=71

6.2.4 Variation in income by cluster and producer type

In 2008, most households from clusters 1 and 2 did not earn enough gross income to rise above the World Bank's income poverty line. Table 14 divides the income of the sample into deciles, taking into account producer type and cluster membership.[35] Using the $1 and $2 per capita per-day criteria for income poverty, and assuming an average household size of five, the corresponding cutoff points for identifying those households in extreme poverty and those in poverty were US$1,825 and US$3,650,

[35] Income levels were estimated for the 2008 calendar year based on the five most important income sources as reported by sampled households. Income from on-farm productive activities was reported as gross income, as 1) the complexity of calculating production costs was not feasible during the household interview and 2) reliable secondary information on coffee production costs (which take into account differences in production modes and technologies among growers) are not available. In this sense, income estimates will overestimate (to varying degrees) the actual income available to Soppexcca members for consumption and savings.

respectively. Using these cutoff points, 185 of the sampled households were income poor in 2008, while 117 were extremely income poor. Among the income poor, for both organically certified and conventional producers, 98% of the households belong to clusters 1 and 2. The percentage of organic producers that can be considered income poor is roughly 66%. This is slightly larger than the percentage of conventional producers that can be considered income poor (58%).

Table 14. Total gross income deciles during 2008

Cluster	1	2	3	4	5	6	7	8	9	10
	173–715	716–1042	1043–1421	1422–1823	1824–2466	2467–3139	3140–4554	4555–7004	7005–11,519	11,520–69,446
Conventional										
1	6	8	9	5	5	2	7	3	4	0
2	14	12	12	17	16	19	12	15	7	5
3	0	1	1	0	0	1	2	5	14	19
Subtotal	20	21	22	22	21	22	21	23	25	24
Organically certified										
1	3	2	3	5	7	2	2	1	3	0
2	5	6	4	3	4	2	5	4	0	0
3	1	0	0	0	0	0	2	1	1	5
Subtotal	9	8	7	8	11	4	9	6	4	5
Total	29	29	29	30	32	26	30	29	29	29

Table 15 presents ANOVA results comparing annual income sources for 2008 with cluster membership. Results indicated significant differences between the clusters for all income sources. Mean gross annual income for the sample was nearly US$5,000. However, the mean annual income for households in cluster 1 was nearly half that amount (US$2,617). Households in cluster 2 followed this closely (US$2,927). The mean annual income for households in cluster 3, at US$14,627, was roughly 4.5 times the mean income for households in clusters 1 and 2.

In general, options for diversifying risks and spreading income generation over the year through on-farm production appeared to be limited across all clusters. For households in clusters 2 and 3, the vast majority of their 2008 income was derived from the sale of coffee (85% and 92%, respectively). While households in cluster 1 derived less of their annual income from coffee (33%), the combination of coffee and off-farm employment generated 88% of 2008 income. Across the clusters, sales of bananas provided limited, albeit steady, income throughout the year. The production of basic grains (corn and beans) was more for home consumption, with only surpluses sold in local markets. The percentage of total income derived from basic

grain sales by households in clusters 2 and 3, at 4%, was twice as much for households in cluster 1.

Table 15. ANOVA results comparing annual income sources (2008) with cluster membership

Dependent variable, with ANOVA outcome	Cluster	Mean (US$) (SD in parentheses)	Standard error	95% confidence interval	
				Lower limit	Upper limit
Total income F(2,292)=80.98, p<.05	1 (n=77)	2,617.89 (±2,557.38)	291.44	2,037.44	3,198.34
	2 (n=162)	2,927.63 (±2,729.88)	214.47	2,504.07	3,351.18
	3 (n=53)	14,627.13 (±13,220.57)	1,815.98	10,983.09	18,271.17
	Total	4,969.49 (±7,604.97)	445.04	4,093.57	5,845.41
Income from sale of coffee to Soppexcca F (2, 292)=50.73, p<.05	1 (n=77)	676.30 (±1,033.05)	117.73	441.83	910.78
	2 (n=162)	1,590.67 (±1,827.73)	143.60	1,307.09	1,874.26
	3 (n=53)	7,211.93 (±8,578.70)	1,178.24	4,847.62	9,576.24
	Total	2,369.85 (±4,543.32)	265.88	1,846.56	2,893.14
Income from sale of coffee to other buyers F(2, 292)=38.77, p<.05	1 (n=77)	191.67 (±229.54)	26.05	139.80	243.55
	2 (n=162)	895.58 (±1,528.08)	120.06	658.49	1,132.67
	3 (n=53)	6,262.33 (±9,582.39)	1,316.24	3,621.10	8,903.57
	Total	1,684.06 (±4,740.90)	277.38	1,138.14	2,229.99
Income from bananas F(2,292)=18.49, p<.05	1 (n=77)	66.85 (±196.82)	22.43	22.17	111.52
	2 (n=162)	121.37 (±171.71)	13.49	94.73	148.01
	3 (n=53)	528.46 (±1,027.21)	142.45	242.48	814.44
	Total	179.69 (±489.06)	28.67	123.26	236.11
Income from basic grains F(2, 292)=4.55, p<.05	1 (n=77)	64.74 (±246.71)	28.12	8.74	120.73
	2 (n=162)	162.72 (±475.82)	37.38	88.90	236.55
	3 (n=53)	329.74 (±748.89)	102.87	123.32	536.16
	Total	167.20 (±498.97)	29.20	109.73	224.67
Income from other agricultural sources F(2, 292)=3.97, p<.05	1 (n=77)	25.88 (±78.74)	8.97	8.01	43.75
	2 (n=162)	99.73 (±381.26)	29.95	40.57	158.88
	3 (n=53)	233.87 (±705.12)	96.86	39.51	428.22
	Total	104.60 (±419.02)	24.52	56.34	152.86
Income from off-farm sources F(2, 292)=61.79, p<.05	1 (n=77)	1,618.34 (±1,651.09)	188.16	1,243.58	1,993.09
	2 (n=162)	157.28 (±465.58)	36.58	85.05	229.52
	3 (n=53)	304.64 (±752.62)	103.38	97.19	512.09
	Total	569.31 (±1,153.94)	67.53	436.40	702.22

6.2.5 Summary

The following key points can be taken from this section:

- The asset index showed that significant levels of asset building had occurred during the assessment period. Those households with the least assets at the beginning of the period were the least likely to have accumulated assets during the five-year assessment period.

- The cluster solution captured variation in key elements of livelihood strategies among the sampled households. The solution distinguished between those with highly limited land area and limited ability to dedicate human capital to on-farm production (cluster 1); those with limited land area but with greater capacity to dedicate human capital to on-farm production (cluster 2); and those with both land and human capital for on-farm production (cluster 3).
- Producers of organic coffee tended to have lower coffee productivity and depend more on off-farm income. However, they were generally not more asset poor than conventional households.
- Among households in clusters 1 and 2, various products in addition to coffee were sold in local and regional markets, but the contribution of total income from products other than coffee was small.

6.3 Changes in natural capital endowment

This section examines changes in natural capital based on the following indicators: 1) number of hectares under production; 2) land-use arrangements, 3) area under coffee production, 4) fertilizer use, 5) and production practices that impact natural capital beyond the household level.

6.3.1 Changes in total land area

Approximately 27% of the sampled households (n=80) increased their total landholdings between 2004–2005 and 2008–2009. This occurred despite the relatively high costs for land expansion and establishing coffee production.[36] However, the number of households expanding their area and the average size of the expansion differed markedly across the clusters. Households in cluster 3 had the highest percentage of households that increased their total landholdings (at 40.4%). This was followed by households in cluster 2 (26.5%) and cluster 1 (20.%) (table 16). Cluster 3 also had the highest number of households that had expended their holdings by more than 4 mz. In comparison, only five households in clusters 1 and 2 combined were able to increase total area by more than 4 mz. Most households in cluster 2 expanded their holding between 1 mz and 2.9 mz, while most households in cluster 1 expanded their holdings by less than 1.9 mz.

[36] The purchase of land for coffee production varies widely in Nicaragua, depending on whether or not the land already has existing coffee plants in production and the location. According to Soppexcca key informants, a manzana of land with coffee in good condition costs between US$4,000 and $5,000. A manzana of land with coffee production in less than prime condition ranges in cost between US$3,000 and $3,500. A manzana of land without coffee in production varies from US$1,000 to $2,000.

Approximately 9% of the sampled households (n=26) reduced their landholdings during the assessment period. Among the various motivations for reductions of landholdings were passing land to offsprings, division of assets because of divorce, sale of low-productive land, exit from agricultural production, and sale of land to cover debt and medical expenses. Only among four households did reduced landholdings exceed 4 mz. In these cases, the reductions were due to the division of land for providing an inheritance to offspring.

Table 16. Frequency distribution for change in landholdings, 2004–2005 to 2008–2009

Change in landholdings	Change in # manzanas	Cluster			Total (n=292)
		1 (n=77)	**2 (n=162)**	**3 (n=52)**	
Reduction	4+	0	2	2	4
	3–3.9	0	1	0	1
	2–2.9	0	3	1	4
	1–1.9	3	6	1	10
	less than 1	2	5	0	7
No change		56	102	28	186
Increase	less than 1	7	6	0	13
	1–1.9	3	14	5	22
	2–2.9	2	13	7	22
	3–3.9	1	4	1	6
	4+	3	6	8	17

Between 2004–2005 and 2008–2009, the total area under agricultural production by the sampled households increased from 1,863 mz to 1,975 mz—an increase of 9.2% (table 17). Among the three clusters, the greatest percent of net change in landholdings was achieved by households in cluster 2, where area increased by 12.6%. (This took into account that 43 households increased their landholdings on average by 2.9 mz, while 17 households reduced their landholdings on average by 2.1 mz.) Households in cluster 1 also recorded a significant net increase in total landholdings—adding 24.25 mz during the five-year period (with an increase of 9.7%). Households in cluster 3 experienced the smallest percent of net change in landholdings (7.4%). On the other hand, they had the highest average increase in landholdings, with holdings increasing an average of 1.6 mz—nearly twice the average increase for the sample as a whole.

Soppexcca provided various services that influenced the land acquisition and usage by its members. Chief among these was long-term credit. Soppexcca provided generous terms for long-term credit, which members repaid with the delivery of coffee over a three-year period, following a three-year grace period. Twenty-five sampled households received about US$70,000 in credit for the purchase of land between

2004–2005 and 2008–2009. Households identified no buyer of coffee other than Soppexcca as having provided long-term credit. For those households that increased their landholdings during the assessment period, the Pearson's correlation coefficient suggests that the relationship between access to long-term credit and the purchase of land is positive and somewhat strong ($r=.476$, $n=90$, $p<.05$). However, correlation is not the same as attribution, and attribution here is especially difficult, given that, in many cases, various factors made possible the acquisition of new land in addition to credit. The following evidence from households illustrates this point. Households #60 and #223 increased their holdings by 4.5 mz and 6 mz, respectively, through a combination of cash income from the sale of coffee and basic grains and credit. Household #131 obtained 4 mz from land reform and another manzana through cash purchase. Household #277 purchased 4 mz with income obtained from the sale of a truck and obtained one additional manzana from an inheritance. Finally, household #205 increased its area by 40 mz with cash income derived from the sale of inherited land.

Table 17. Change in total landholdings, 2004–2005 to 2008–2009

Cluster		Total area 2004–2005 (SD)	Total increase in area	Total reduction in area	Total area 2008–2009	% change
1 (n=77)	Sum (mz)	249.00	28.00	3.75	273.25	9.74
	Mean	3.23 (±3.13)	0.36	0.05	3.54	
2 (n=162)	Sum (mz)	709.00	124.47	35.00	798.47	12.62
	Mean	4.38 (±4.36)	0.77	0.22	4.93	
3 (n=52)*	Sum (mz)	873.75	83.5	19.00	938.25	7.38
	Mean	17.06 (±15.65)	1.58	0.37	17.04	
Total (n=291)*	Sum (mz)	1,944.85	235.97	57.75	2,123.07	9.16
	Mean	6.68 (±9.10)	0.80	0.20	7.30	

* Excludes one case with reduction in total area of 65 manzanas (mz)

6.3.2 Changes in area under coffee production

Fifty-four percent of the sampled households achieved an increase in their area under coffee production between 2004–2005 and 2008–2009. In cluster 1, roughly 38% of households increased their area under coffee production (table 18), compared to 57% in cluster 2 and 68% in cluster 3. Households in cluster 2 made up roughly 59% of the total number of households that expanded areas under coffee production. Cluster 1 was the only case where the majority of households did not increase their coffee-production area. This likely reflects their overall smaller land area and reduced access to credit from Soppexcca and other sources (see section on financial capital), among other factors.

The 17 households that reduced their area under coffee production provided various explanations. The two most common reasons were inheritance to sons or

daughters and land exchange (whereby the new land had less, though perhaps more productive, coffee or coffee plantations closer to the home). Other causes were divorce (n=2), sale of land to cover debt (n=1), and unproductive coffee plantations, with replacement of coffee with basic grains or cocoa (n=3).

Table 18. Frequency distribution of change in area under coffee production, 2004–2005 to 2008–2009

Change in area under coffee production	Change in # manzanas	Cluster			Total (n=292)
		1 (n=77)	2 (n=162)	1 (n=77)	
Reduction	4+	0	0	1	1
	3–3.9	0	1	0	1
	2–2.9	0	3	2	5
	1–1.9	1	0	1	2
	less than 1	5	3	0	8
No change	0	42	62	13	117
Increase	less than 1	14	36	1	51
	1–1.9	9	38	10	57
	2–2.9	2	12	8	22
	3–3.9	2	5	5	12
	4+	2	2	12	16

The total area under coffee production by the sampled households increased from 827 mz to 1,066 mz between 2004–2005 and 2008–2009—an increase of nearly 30% (table 19). The highest percent change in area under coffee production was recorded by cluster 2 (23.7%); although, the percent change in area was only slightly smaller for clusters 1 and 3. Evidence also suggested that households intensified their production of coffee over the five-year period. Among households in cluster 1, the percentage of area dedicated to coffee production increased by 8%, from 52.6% to 60.6%. Among households in clusters 2 and 3, the coffee area expanded by 7.3% and 8.3%, respectively.

Sampled households identified whether their expansion of coffee area resulted from the purchase of new land, land clearance, and/or the conversion of other production systems to coffee. They reported approximately 151 mz of coffee production that was expanded on previously existing land, thus requiring changes in land use (elimination of annual crops, reduction of forest cover, or bringing idle land into production). The most common crop reduced was basic grains. Roughly 50% (or 75 mz) of expanded coffee production was achieved through reduced basic grain production. Another 35% (or 53.3 mz) of expanded coffee production was achieved through the cultivation of previously idle land. The reduction of forest cover attributed to only 7% (or 10.5 mz) of the expansion in coffee. The remaining 7% of expanded coffee production came at the expense of pasture (8.75 mz) and horticulture (3 mz).

Table 19. Change in area under coffee production, 2004–2005 to 2008–2009

Cluster	Total area under coffee 2004–2005	Mean area under coffee 2004–2005 (SD)	% total area under coffee 2004–2005	Total area under coffee 2008–2009	Mean area under coffee 2008–2009 (SD)	% of total area under coffee 2008–2009	% change in area under coffee 2004–2005 to 2008–2009
1 (n=77)	131.00	1. 73 (±1.32)	52.61	165.50	2.15 (1.44)	60.57	26.34
2 (n=162)	316.00	1.95 (±1.41)	44.57	414.00	2.57 (1.54)	51.85	31.01
3 (n=53)	381.00	7.18 (±8.21)	43.61	487.25	9.19 (6.82)	51.93	27.89
Total (n=292)	827.00	2.83 (±4.22)	47.72	1,066.75	3.67 (4.13)	50.25	28.99

Logistic regression showed the effects of credit, off-farm income, and preexisting land size on the expansion of area under coffee production. The strongest predictor of increased area under coffee was access to long-term credit. For each US$500 instalment of credit obtained, households increased their odds of expanding area under coffee production by 1.5 times (table 20). On the other hand, the larger the preexisting landholding, the less likely a household was to have expanded their area under coffee production. This reflected the fact that households with relatively large landholdings were less likely to desire growth in scale compared to households with smaller areas. For households in clusters 1 and 2, growth in the area under coffee production during the assessment period was likely an attempt to recuperate area previously under coffee that was lost during the coffee crisis (due either to neglect or removal for the planting of basic grains).In general, the higher the dependence on off-farm labour for total income generation, the less likely the odds of having expanded the area under coffee production. This reflected these households' higher degree of vulnerability and the related constraints on expanding production for the market.

Table 20. Multiple logistic regression showing effects of credit, off-farm income generation and preexisting land ownership on coffee expansion

(N=292)*	B	S.E.	Sig.	Odds ratio
Preexisting land holding (2004–2005)	-.065	.025	.010	.937
Percentage income generated off-farm	-1.230	.525	.019	.292
Age of Soppexcca member	-.028	.013	.030	.972
Total credit received between 2004–2005 and 2008–2009 (US$500 units)	1.589	.282	.000	4.897
N household members	-.038	.065	.561	.963
Constant	1.532	.572	.007	4.627

* The model as a whole correctly classified 77.2% of all cases.

6.3.3 Changes in fertilizer usage

The ability of farming households to make the best possible use of their land depends, in part, on their timely access to quality fertilizers. In this context, fertilizer usage and its related impacts of soil fertility are important. Maintaining high yields over time requires a positive soil nutrient balance in the coffee plantation.[37] Without fertilization, this nutrient balance is negative—unless yields are extremely low—and sustained coffee production requires regular application of organic or inorganic fertilizers. See annex 2 for details on coffee nutrient requirements and related fertilizer options in Nicaragua. This remainder of this section describes changes in fertilizer use by organically certified and conventional households.

Fertilization for organic coffee production

In the 2008–2009, about 37% of the organically certified households reported using compost on their coffee plantations and all reported using dried coffee pulp[38] (table 21). The use of dried coffee pulp requires relatively little investments in labour or transport. However, the labour- and transport-related costs of fertilization with compost can be high given the large amount of compost needed and the scarcity of key ingredients, such as cow or chicken manure.[39] Among sampled Soppexcca members that were organically certified in 2009, 25% in cluster 1 reported having produced compost in the 2008–2009 production year. The percentage of use was higher among organic certified households in clusters 2 and 3 (42.4% and 50%, respectively). The reduced use of compost by households in cluster 1 reflects the relatively high labour costs for the production of compost (including opportunity costs) and the limited ability of these households to cover the related costs. Interviews with households and Soppexcca revealed that the nutritional context of the compost fertilizer was low, due to 1) lack of access to cattle manure and 2) lack of basic tools (e.g., thermometer for measuring internal temperature of the compost pile) and skills for production of compost.

[37] The soil nutrient balance is determined by the nutrients coming from fertilizers, the atmosphere, and shade trees (litter and mycorrhiza fungi) and nutrients leaving the plantation through the production of coffee berries and the leaching of nutrients into the atmosphere and waterways.

[38] It was not possible to obtain reliable estimates from households on how much compost was produced and applied to their coffee plantation since 1) the units for compost vary by household and the quality of the compost applied (in terms of nutrient content) varies according to the inputs used and the production methods applied.

[39] Labour involved the collection of organic materials, transportation, preparation, and application on the farm. The first few hundred pounds of organic material can be obtained with relatively little effort since coffee pulp, bean stems, and cattle manure can be sourced nearby. However, access to subsequent tons may be prohibitive due to the costs related to transportation in mountainous areas with poor road conditions. The production of several tons of compost requires infrastructure for storage, as well as equipment for measuring the temperature and nutritional content. During one interview, a formally certified organic producer recalled having stored mounds of compost inside this home (for lack of an on-site storage facility) for months at a time, enduring the smell and the heat generated by the compost.

Table 21. Use of compost and dried coffee pulp for coffee fertilization, 2008–2009

	# of households using compost	%	# of households applying dried coffee pulp	%
Cluster 1 (n=77)				
Conventional	2	4.1	25	51.0
Organic	7	25.0	28	100.0
Cluster 2 (n=162)				
Conventional	8	6.3	79	61.7
Organic	14	42.4	33	100.0
Cluster 3 (n=53)				
Conventional	2	4.7	26	60.5
Organic	5	50.0	10	100.0

For many organically certified households, the most important source of externally sourced nutrients was processed chicken manure sold under the trademark Biogreen.[40] During the three-year period between 2006–2007 and 2008–2009, among households that reported using Biogreen, the mean number of bags of Biogreen applied per year was approximately 27 for households in cluster 1, 31 for households in cluster 2 and 40 for households in cluster 3. In 2006–2007, Soppexcca provided Biogreen at no cost (with project funds) in an effort to increase yields of households already certified. This explains in large part the reason behind the markedly higher usage in Biogreen in 2006–2007 by households in cluster 1 (table 22). Many of these households stopped using Biogreen when the subsidies ran out. Over the next two years, Soppexcca provided Biogreen at a cost of US$7.03/100-lb sack (including delivery).

Table 23 highlights the overall lack of nitrogen for coffee production faced by most organically certified households, despite the introduction of Biogreen. During the 2008–2009 production year, the average nitrogen balance on certified organic coffee plantations was negative across all three clusters. The nitrogen balance was worst for households in cluster 3 (-81.99 kg), followed by those in cluster 1 (-57.66

[40] In 2006–2007, Soppexcca introduced Biogreen to its organically certified members. Since then, it has been shown to be the best option for supplying nitrogen for organic coffee production According to key interviews with Soppexcca staff, previous efforts at supplying nutrients through the production of compost and dried coffee pulp were unsuccessful. The use of Biogreen is controversial because the chicken manure used for Biogreen production is sourced from the largest factory farm in Nicaragua. The only organic certifying agency in Nicaragua that permitted the use of Biogreen was Biolatina. In 2009, however, Biolatina threatened to cut Biogreen from its list of approved organic inputs. According to the Nicaraguan representative of Biolatina, Jaime Picado, the change in policy responded to perceived changes in the flexibility of the interpretation of the EU organic regulations concerning chicken-based manure fertilizer. He also stated that Biogreen did not comply with regulations because it was produced from chickens that were produced in an intensive way. He advised that organic producers should pursue "sustainable" options for fertilization, based on inputs obtained on farm. Follow-up interviews with Soppexcca in late 2009 revealed that Biolatina had not yet formally change their regulation, and thus Biogreen and other chicken-manure based fertilizers continued to be in use by organically certified households.

kg) and those in cluster 2 (-39.01). However, without access to Biogreen, the average nitrogen balance would have been significantly worse, at -53 kg for households in cluster 1, -51 kg for households in cluster 2, and -155 kg for households in cluster 3.

Table 22. Reported Biogreen usage, 2006–2007 to 2008–2009

Coffee production year	N households using at least one bag of Biogreen	% sampled households using at least one bag of Biogreen	Total bags used	Average # bags used (SD)
Cluster 1 (23 organic)				
2006–2007	11	45.8	291.0	26.5 (±15.7)
2007-2008	4	16.7	131.2	32.8 (±45.1)
2008–2009	4	16.7	100.8	25.2 (±20.2)
Cluster 2 (27 organic)				
2006–2007	14	51.9	506.9	36.2 (±31.9)
2007–2008	14	51.9	428.5	30.6 (±22.3)
2008–2009	13	48.2	359.2	27.6 (±21.6)
Cluster 3 (8 organic)				
2006-2007	7	77.8	430.0	61.42 (±98.2)
2007–2008	5	55.6	118.4	23.67 (±19.5)
2008–2009	4	44.4	150.4	37.60 (±16.3)

Table 23. Nitrogen balance in organically certified coffee, 2006–2007 to 2008–2009

Coffee production year	Average area in coffee (manzana)	Average minimum amount (kg) of N required *	Average total N supplied with Biogreen **(kg)	Estimated N shortfall or overage (kg)
Cluster 1 (n=23) (standard deviation in parenthesis)				
2006–2007	2.2 (±1.6)	71.28	26.8 (±36.3)	-44.49
2007–2008	2.2 (±1.6)	71.28	13.9 (±42.3)	-57.35
2008–2009	2.0 (±1.3)	66.00	8.3 (±23.2)	-57.66
Cluster 2 (n=27)				
2006–2007	1.9 (±.7)	62.04	36.1 (±56.6)	-25.96
2007–2008	1.9 (±.7)	62.70	36.7 (±52.9)	-26.02
2008–2009	1.9 (±.7)	62.70	23.69 (±30.4)	-39.01
Cluster 3 (n=8)				
2006–2007	6.0 (±3.6)	198.99	650.1 (±692.9)	451.15
2007–2008	5.8 (±2.5)	190.74	93.6 (±118.6)	-97.11
2008–2009	5.8 (±2.5)	190.74	108.8 (±136.4)	-81.99
All households (n=58)				
2006–2007	2.5 (±2.0)	83.82	30.5 (±172.9)	-53.34
2007–2008	2.6 (±2.0)	84.15	35.5 (±66.2)	-48.66
2008–2009	2.5 (±1.9)	82.50	30.2 (±64.5)	-52.30

* The product of the average number of manzanas under coffee production during the three-year period and the estimated amount of nitrogen required to keep coffee yields at a reasonable level and to maintain soil fertility, in addition to recycling coffee pulp and using nitrogen-fixing shade trees (33 kg/manzana). Calculation assumes that households use dried coffee pulp for fertilization. A reasonable level of productivity is considered the national average for coffee production (562 kg/manzana green coffee, or 1,124 kg wet parchment coffee), as reported by Flores et al. 2002. See Valkila (2009) for discussion of nutritional requirements for organic coffee production.

** Based of reported number of sacks of Biogreen applied in a given year. Biogreen provides 1 kg of N per 45 kg sack.

Fertilization for conventional coffee production

For households that produced conventional coffee, the use of synthetic fertilizer represented a major financial investment in natural capital.[41] This is especially true of the 2008–2009 production year when the cost of fertilizer reached record high prices.[42] Data on fertilizer use was collected from 152 producers between 2006–2007 and 2008–2009. Seventy-two of the households (47.4%) reported no fertilizer use during the period. These households applied organic fertilizers (e.g., dried coffee pulp), and generally had ultralow productivity (table 24). Among households in cluster 1, approximately 42% applied at least one 100-lb. bag of complete fertilizer in 2008–2009, while 18% applied at least one bag of urea. The average application was 614 lbs/household of complete fertilizer and 465 lbs of urea. The number of households in cluster 1 that applied synthetic fertilizer and urea is significantly higher in 2008–2009 than for the previous two years.

Table 24. Reported synthetic fertilizer usage, 2006–2007 to 2008–2009

Fertilizer used	Coffee production year	N households using at least one bag of fertilizer	% sampled households using at least one bag of fertilizer	Total bags used	Average # bags used (standard deviation in parenthesis)
Cluster 1 (n=33 conventional producers)					
Complete fertilizer	2006–2007	7	21.2	48.0	6.9 (±3.0)
	2007–2008	9	27.3	55.6	6.2 (±3.3)
	2008–2009	14	42.4	86.0	6.1 (±3.5)
Urea	2006–2007	2	6.1	10.2	5.1 (±4.1)
	2007–2008	3	9.1	19.7	6.6 (±4.3)
	2008–2009	6	18.2	28.0	4.7 (±3.0)
Cluster 2 (n=92 conventional producers)					
Complete fertilizer	2006–2007	49	53.3	225.5	4.6 (±3.1)
	2007–2008	61	66.3	306.7	5.0 (±3.3)
	2008–2009	69	75.0	403.9	5.9 (±5.2)
Urea	2006–2007	17	18.5	68.8	4.0 (±1.7)
	2007–2008	20	21.7	69.8	3.5 (±1.6)
	2008–2009	22	23.9	121.5	5.5 (±6.1)
Cluster 3 (n=27 conventional producers)					
Complete fertilizer	2006–2007	25	93.6	102.0	4.1 (±3.0)
	2007–2008	26	96.3	103.7	4.0 (±3.0)
	2008–2009	23	85.2	94.1	4.1 (±3.2)
Urea	2006–2007	9	33.3	42.1	4.7 (±2.2)
	2007–2008	8	29.6	30.8	3.9 (±2.6)
	2008–2009	11	40.7	42.4	3.9 (±2.5)

[41] For growers of Arabica coffee in southern Brazil, the share of fertilizers in total production costs varies between 16.2% and 23.2% (ICO 2009). In Colombia, fertilizers accounted for 23.7% of production costs in 2008, while in Costa Rica, fertilizers accounted for 12.3% of production costs in 2007–2008 (idid).

[42] In the 2008–2009 coffee production year, the cost of inorganic fertilizer reached record high prices. The annual average price of urea in the world market went up from US$309/ton in 2007 to US$517/ton in 2008. Prices reached US$770/ton in August 2008, before falling steadily during the remainder of the 2008 (ICO 2009). The high fertilizer prices in 2008 and 2009 pushed up production costs by as much as 30% in Central America and resulted in reduced nitrogen supplies and slower crop development (Ganes-Chase 2009).

The marked increase in fertilizer use 2008–2009 coincides with Soppexcca's efforts to link fertilizer purchases to short-term credit. Beginning in the 2007–2008 production year, inorganic fertilizer was sold by Soppexcca to its members at a cost of approximately US$43 per 100-lb sack.[43] Prior to that year, Soppexcca members purchased inorganic fertilizer on their own accord from agricultural input suppliers or from local coffee buyers. According to key informants in Soppexcca, the decision of Soppexcca to facilitate the purchase of fertilizer for its members was to 1) increase the amount of the annual credit for production that was actually spent on coffee production (rather than on basic household consumption) and 2) reduce the costs of inorganic fertilizer purchases.

Table 25 highlights differences in fertilizer usage for conventional coffee production among the clusters. Between 2006–2007 and 2008–2009, the average nitrogen balance for households in cluster 1 was -15.41 kg. Households in cluster 2 fared better at 23.70 kg, while those in cluster 3 achieved 122.83 kg. Limited use of fertilizers partially explained why the average productivity in coffee for households in cluster 1 (401.82 kg/manzana) fell far below the national average productivity (1,124 kg/manzana). Despite the tendency of households in cluster 2 to use the recommended amount of nitrogen in their plantations, average productivity in coffee for these households (831.82 kg/manzana) did not meet the national average, suggesting that factors other than fertilizer use limited their productivity (e.g., production techniques, pest and disease management). Households in cluster 3, with an average productivity of 1,206 kg/manzana), on average, had a surplus of nitrogen usage and met the national average productivity.

6.3.4 Change in herbicide usage

Agrochemical abuse can lead to erosion of natural capital through reduced biodiversity and sustainability. In general, evidence suggests that smallholders may overuse herbicides as a result of bad advice, social pressure, and efforts to reduce production related risks.[44] The two most commonly identified herbicides used in

[43] The following types of inorganic fertilizers were sold by Soppexcca to its members during the 2008–2009 coffee production year: 18-1-17 for US$29.80, 21-30-01 for US$57.65, and 20-20-0 for US$44.10. Beginning in 2009–2010, only 25-5-12 was sold at a cost of US$24.50. The offer of only one fertilizer allowed for faster delivery by the fertilizer wholesaler.

[44] It is commonly asserted that smallholders may rely on smaller quantities of chemical inputs, which function as a substitute for manual control practices. However, this may not always be the case. In Costa Rica, Bellamy (2010) shows that smallholders may apply as much, if not more, herbicide for coffee production—while at the same time, investing significantly higher amounts of household labour used in the manual control of weeds—than their larger-scale counterparts. Among the factors that she attributes to this finding are: risk-averse behaviour regarding the use of herbicides (small-scale producers have fewer resource available to them as a safety net during years when profits are lower than expected), influence of chemical input providers on production technologies (and related lack of technical assistance by government-based organizations and NGOs), and social pressure (the idea that legitimate producers are those with "clean" coffee plantations).

coffee production by Soppexcca members were paraquat and glyphosate.[45] The sampled households reported generally low use of herbicide; usage in 2008-2009 averaged 1.5 herbicide applications during the production year, with an average application of 1.24 litres of herbicide. Average usage per year is 1.86 litres/manzana/year. This usage is very low in comparison with other studies from Central America. One recent study by Bellamy (2010), estimated an average application of 4.78 litres/manzana/year (6.47 litres/hectare/year) for small-scale coffee producers in Costa Rica. Interviews with households reported that few applied the recommended number of applications. Rather, they tended to apply herbicide once during the year (during the wet season), and carry out manual removal of weeds during the rest of the year.

Table 25. Nitrogen balance in conventional coffee, 2006–2007 to 2008–2009

Cluster	Mean area in coffee (manzana)	Mean minimum amount (kg) of N required *	Mean total N supplied with compete fertilizer **(kg)	Mean N shortfall or overage (kg)
1 (n=32)	1.3 (±1.1)	45.55	30.13 (±45.52)	-15.41
2 (n=95)	1.5 (±0.8)	51.29	74.99 (±97.64)	23.70
3 (n=26)	6.2 (±3.7)	196.78	319.60 (±262.35)	122.82
All households (n=153)	2.3 (±2.5)	75.61	108.56 (±166.79)	32.95

* The product of the average number of manzanas under coffee production during the three-year period and the estimated amount of nitrogen required to keep coffee yields at a reasonable level and to maintain soil fertility, in addition to recycling coffee pulp and using nitrogen-fixing shade trees (33 kg/manzana) Calculation assumes that households use dried coffee pulp for fertilization. A reasonable level of productivity is considered the national average for coffee production (562 kg/manzana green coffee, or 1,124 kg wet parchment coffee), as reported by Flores et al. (2002). See Valkila (2009) for nutritional requirements for organic coffee production.

** Based of reported number of sacks of fertilizer applied in a given year. It is assumed that complete fertilizer is 25-5-12 used, which provides 6.75 kg per 45-kg sack.

[45] Paraquat (also referred to by its trade name Gramoxone) acts as a nonselective that destroys the green tissue of the plant by drying the leaves. Its use has been banned in 13 countries, including: Sweden, Denmark, Austria, and Finland (Binham 2003). Its use in the United States is restricted because of its high toxicity, high epidermal absorption, and longer persistence in the environment (EPA 1997, cited in Bellamy 2010). In Germany, the product is restricted to use on fields crops only once every four years (Madeley 2001). Paraquat is less expensive than glyphosate and readily available in Nicaragua. Although glyphosate (also referred to by its commercial name Round-up) is more expensive than paraquat, producers may prefer its use it because it completely kills the weeds. In the agricultural environment, glyphosate can be toxic to beneficial soil organisms and beneficial arthropod predators (Buffin and Jewell 2001). Glyphosate is of concern for environmental reasons, in particular for its effects on the aquatic environment. It is moderately toxic to fish. The use of glyphosate may result in significant population losses of a number of terrestrial species through habitat and food supply destruction and thus threaten endangered species and biodiversity. It also affects beneficial insects and earthworms. Nitrogen fixation may be reduced, lowering soil fertility. It can increase the susceptibility of some nontarget plants to fungal diseases and interferes with other metabolic processes such as ion and lignin production. Glyphosate can be persistent for more than three years in soils, depending on soil type and climate and has been found in surface water and groundwater.

6.3.5 Change in wastewater disposal methods

Coffee wetmilling—the process of removing the pulp from the coffee cherry and the mucilage from the coffee bean through fermentation—is a major source of water contamination in coffee-growing areas in Central America.[46] Traditionally, producers in Nicaragua wet milled along the banks of a river. This eliminated the need for water pumps and other wet-milling infrastructure. In this context, improvements in water quality can be obtained when smallholders refrain from discharging contaminated water (from fermentation) and coffee pulp directly into an aboveground water source.

Sampled households reported their disposal method for wastewater and coffee pulp for two periods: 2008–2009 and the year prior to their joining Soppexcca. Among the producers of conventional coffee, 57.5% of those in cluster 1 (n=26), 73.9% of those in cluster 2 (n=82), and 69.8% (n=30) of those in cluster 3 reported having adopted more environmentally friendly techniques for dealing with wastewater (table 26). On the other hand, 35% of sampled conventional households in cluster 1 (n=14), 26.1% of those in cluster 2 (n=29), and 16.3% of those in cluster 3 (n=7) discharge wastewater directly into the stream—the same as they did prior to joining Soppexcca. The low adoption of more environmentally friendly wastewater disposal methods by producers of conventional coffee from cluster 1 reflected constraints on time (due to need to work off-farm) and limited human capital (many from cluster 1 are single-headed households—see human capital discussion below). The majority of the sampled organically certified producing households (across the three clusters) reported having adopted more environmentally friendly methods for dealing with wastewater since their affiliation with Soppexcca.

Households identified the factors that influenced their adaptation of environmentally friendly methods for wastewater disposal. Approximately 66% of the sampled households identified technical assistance and training provided by Soppexcca as the major factor. Several households (about 31%) responded that the changes were due to their own initiative, for example, by observing changes carried out by neighbouring households. A small percentage (about 3%) identified technical assistance from NGOs and other coffee buyers as important in their decision to upgrade.

[46] Water used in the milling process is highly contaminated, containing sugar from the pulp and residuals from the fermentation, and can be harmful to surrounding water bodies, human health, and aquatic life if discharged directly into surface waters. Based on a chemical analysis of the wastewater generated from a coffee-processing plant, Haddis and Devi (2008) found that wastewater contained organic load, nutrients and suspended matter. They found that the people residing near a large-scale wet-processing plant who used stream water containing pulping water for domestic purposes suffered from severe health problems: 84% of the total surveyed population suffered a spinning sensation, 32% had eye irritation, 85% reported skin irritation, 42% had stomach pain, and 25% suffered from nausea.

Table 26. Changes in methods used for the wastewater disposal

Cluster	Disposal methods reported by sampled households during the production year prior to joining Soppexcca	Disposal methods reported by sampled households in 2008–2009		
		Disposal in lagoon or pit	Application as fertilizer	Discharge into water bodies
Conventional				
1 (n=40)	Disposal in lagoon or pit	2	0	0
	Application as fertilizer	1	0	0
	Discharge into water bodies	23	0	14
	Total	26	0	14
2 (n=111)	Disposal in lagoon or pit	12	0	0
	Application as fertilizer	1	0	0
	Discharge into water bodies	69	0	29
	Total	82	0	29
3 (n=43)	Disposal in lagoon or pit	5	0	0
	Application as fertilizer	0	0	0
	Discharge into water bodies	30	1	7
	Total	35	1	7
Organically certified				
1 (n=26)	Disposal in lagoon or pit	2	0	0
	Application as fertilizer	0	0	0
	Discharge into water bodies	24	0	0
	Total	26	0	0
2 (n=30)	Disposal in lagoon or pit	5	0	0
	Application as fertilizer	1	0	0
	Discharge into water bodies	24	0	0
	Total	30	0	0
3 (n=10)	Disposal in lagoon or pit	2	0	0
	Application as fertilizer	0	0	0
	Discharge into water bodies	8	0	0
	Total	10	0	0

6.3.6 Insecure land tenure and its effects on natural capital

Given the expenses required to maintain and expand natural capital (e.g., purchase of fertilizer, purchase of land, renovation of coffee), such investments are likely only when land tenure is reasonably secure. Two base cooperatives affiliated with Soppexcca, El Esfuerzo and Julio Hernandez, emerged out of the collectivization of agriculture that occurred during the Sandinista government of the 1980s. These base cooperatives experienced relatively small changes in their area under coffee production (fig. 7) during the assessment period. Highly insecure land tenure was the primary reason for such limited expansion (discussed below).

Struggle for land tenure: case of El Esfuerzo

The history of coffee production by members of El Esfuerzo and Julio Hernandez make clear the struggles in accessing natural capital. Before the 46 households organized under the umbrella of El Esfuerzo, they worked as labourers on the coffee

plantation of Julio Montenegro. After the Sandinistas took power, the coffee-growing lands of Julio Montenegro were confiscated, so the households provided labour to the government in operation of the coffee plantation. Following the Sandinistas' withdrawal from power in 1990, the government of Violeta Chamorro extended a 10-year land rental agreement with the households, known as the Area Propiedad de los Trabajadores (APT), or Workers' Property Area. The households established an enterprise, named Denis Gutierrez, to handle marketing of their coffee and the payment to the state under the APT program.

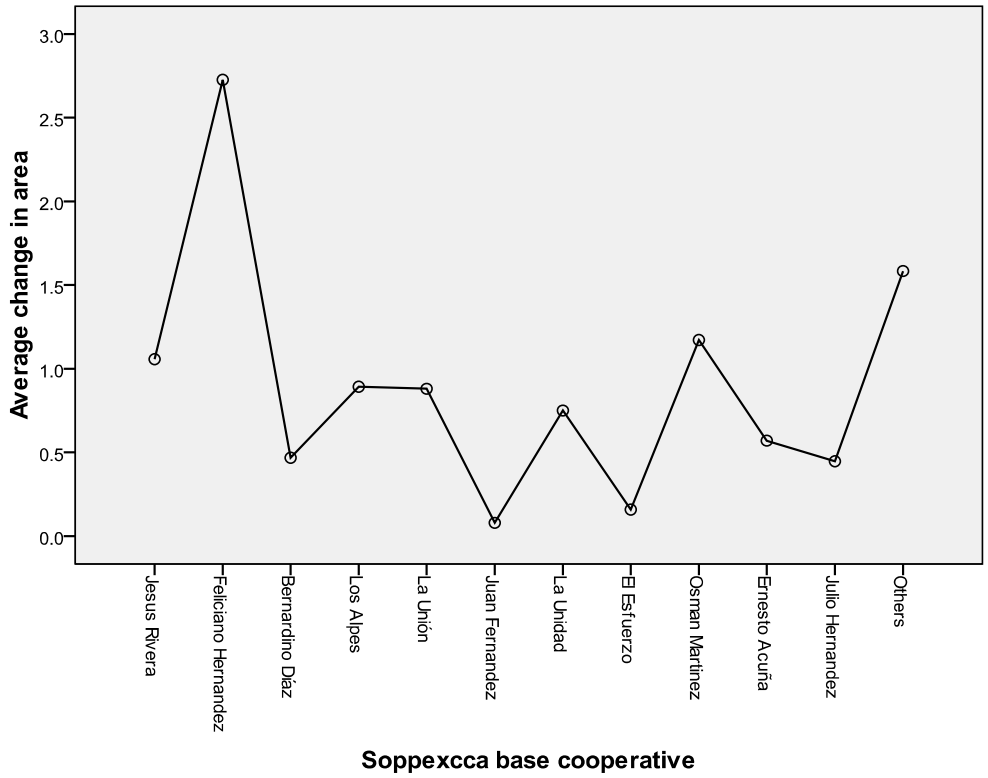

Fig. 7. Change in coffee production area, 2004–2005 to 2008–2009, by base cooperative

Under a marketing agreement made with the coffee exporter Agrisami, Agrisami provided credit to the households and the households supplied a set amount of green coffee to Agrisami. The agreement worked as designed for several years. Then, in the late 1990s (exact date unknown), the original owner of the coffee plantation, Julio Montenegro, returned to reclaim his land. Agrisami provided Denis Gutierrez with a three-year loan to compensate Julio Montenegro. The loan was to be paid with deliveries of coffee. This revised agreement worked as designed for two

years; however, in the third year, Agrisami failed to provide annual credit for the production of coffee. The households organized under Denis Gutierrez struggled to collect sufficient coffee to meet their delivery quota, which, according to them, they did meet. However, Agrisami claimed that Denis Gutierrez failed to meet its quota (with an outstanding debt of US$1.4 million), and therefore, Agrisami took possession of the land. In the late 1990s, the households retained a lawyer, who fought the case for nine years before achieving success. Currently, the lawyer is in possession of the collective land title and will release it to the households (now organized as El Esfuerzo) when she is paid the US$80,000 owed for her services. The major reason the households sought membership with Soppexcca was for assistance in resolving their land titling problem.

Struggle for individual land titles: case of Julio Hernandez

The households that made up Julio Hernandez once laboured on a state-owned coffee plantation Corinto Finca. In 1990, a private company began administering the plantation, while ownership remained with the government. In 2000, the households living on Corinto Finca petitioned successfully for a group title to the land, receiving title in 2001. However, little had changed in how the households participated in coffee production. They were paid for their labour in coffee production by a newly formed community association, and had little understanding or control over how their coffee was sold or how any potential surplus from coffee sales was used. In 2002, they retained a lawyer in an effort to obtain individual plots. The households covered the costs of the lawyer and a community representative. In 2003, without having obtained individual land titles, households divided the common area into plots of 3.75 mz and began to produce coffee individually. In 2003, 13 households formed the cooperative Julio Hernandez and sold coffee for the first time through Soppexcca. At that time, all the coffee plantations were highly depleted. In 2005, members of Julio Hernandez began to invest in renovation with credit from Soppexcca. In 2006, individual titles were finally received. Overall productivity levels have increased significantly, from a two-year average of 996 lbs/manzana in 2004–2005 and 2005–2006 to a two-year average of 1,569 lbs/manzana in 2008–2009 and 2007–2008. In recent years, all sampled households of Julio Hernandez reported access to long-term credit for renovation.

6.3.7 Summary

Changes in key indicators for natural capital during the assessment period:

- Significant number of households (80) acquired new land for agricultural production, with most for coffee production. At the same time, a smaller, but still significant, number of households reduced their landholdings. Net percentage increase in landholdings was approximately 9.2% for the sample.
- A greater number of households expanded coffee production on existing land (158). To the extent that coffee is more stable and less extracting than other crops, this represents an increase in natural capital. However, for households in clusters 1 and 2, increased coffee production generally came at the expense of reduced basic grain production, which could result in increased vulnerability to food shortages over the short to midterm.
- Soppexcca was the major source of long-term credit for the expansion of land. For households in cluster 1 and all organically certified households, it was the only source of credit during the five-year assessment period.
- For much of the sample, the soil nutrient balance for coffee production was negative. Many households in cluster 1 did not apply fertilizer of any type. On the other hand, beginning in 2007–2008, the use of fertilizers increased significantly for households in clusters 2 and 3.
- The recent increase in fertilizer use among conventional households was tied to Soppexcca's incorporation of fertilizer purchases into short-term credit, which included transport and a relatively low price for fertilizer.
- In general, the building of natural capital has been extensive and significant, both for the households themselves and the communities in which they live. Quantitative and qualitative evidence suggests that Soppexcca-provided interventions have played a significant role in facilitating the building of natural capital.

6.4 Changes in human capital endowment

Changes in human capital endowments are perhaps the most difficult to assess, as on-farm practices could not be measured and direct questions of practices had the potential to be fraught with bias. Rather than focus on the outcomes of interventions (e.g., number of training events in which the household participated), the research aimed to capture data on the outcomes (e.g., improved skills for on-farm production). In the case of skills for coffee plantation management, analysis focused on identifying households that had not implemented good production practices. The focus on the

negative allowed for the control of the effects of fertilizer use on productivity (see section 6.2.1). Other indicators applied were new skills for enhancing coffee quality and new skills for production of agricultural products other than coffee. Analysis also examined the capacities of female-headed households to intensify coffee production and examined the perceptions of households on the utility of Soppexcca-provided services.

6.4.1 Skills and capacities for coffee plantation management

Among those households that did not apply purchased fertilizers to coffee production, achievement of coffee productivity within the range of 1,000–1,600 lbs/year/manzana provided an indicator of a household's ability to apply good production practices in coffee. As noted previously, to separate out the effects of good production practices from fertilizer application, only those households that did not apply fertilizer were considered. Thus, households with productivity levels between 1,000 and 1,600 lbs/year/manzana that did not apply fertilizer were considered to have applied good production practices and to have acquired these practices during the assessment period through Soppexcca-provided assistance (most households did not report access to technical assistance prior to Soppexcca membership). Households that had productivity levels below 1,000 and that did not apply fertilizer are assumed not to have acquired good production practices during the assessment period.

Table 28 shows that 113 households had a five-year average productivity for coffee of less than 1,000 lbs/year/manzana. Roughly 62% of these households were conventional producers. Three of every four of these households belonged to the lowest productivity quartile (90–415 lbs/year/manzana) and belonged to cluster 1. The other 38% of households with less than 1,000 lbs/year/manzana production were organically certified. The 23 organically certified households from cluster 1 made up 82% of all organically certified households in cluster 1. These data suggest that many of the sampled households from clusters 1 and 2 have yet to develop the skills or capacities to apply good production practices. Evidence also suggested that some resource-poor households did improve their capacities for applying good production practices. Fifty-seven households either had preexisting production skills or acquired new skills for implementing good production practices related to coffee. Over three-quarters of these households (n=44) were conventional producers, many of which belonged to cluster 2. Thirteen organically certified households had average productivity levels between 1,000 and 1,600 lbs/year/manzana, the vast majority belonging to cluster 2.

Regarding attribution, most households generally did not report access to technical assistance before joining Soppexcca (see section on social capital). This suggests that Soppexcca contributed to their building of human capital. However, attribution is weak, since preexisting high levels of knowledge about plantation management may have facilitated improved management practices, as well as information obtained through contacts with other producers. In addition, some households with low productivity (below 999 lbs/manzana), may have acquired necessary skills but were unable to implement them due to other obligations or lack of complementary assets (e.g., family labour or disposable income for hiring labour).

Table 27. Productivity quartiles for households with low and medium productivity levels (2004–2005 to 2008–2009)

	Quartiles				
Low productivity: households with 5-year avg. productivity between 0–999 lbs/manzana	1	2	3	4	Total
Organic (Mean=546; SD=244)	80-350	351-560	561-737	738-960	
Total # hh	10	11	11	11	43
# Cluster 1	7	4	8	4	23
# Cluster 2	3	5	3	5	16
# Cluster 3	0	2	0	2	4
Conventional (Mean=604; SD=220)	90-415	416-636	637-752	753-999	
Total # hh	17	17	18	18	70
# Cluster 1	13	10	6	3	32
# Cluster 2	3	7	11	14	35
# Cluster 3	1	0	1	1	3
Medium productivity: households with 5-yr avg. productivity between 1,000–1,600 lbs/mz	1	2	3	4	Total
Organic (Mean=1,256; SD=178)	1,070-1,083	1,084-1,230	1,231-1,408	1,409-1,527	
Total # hh	3	3	5	2	13
# Cluster 1	0	0	1	1	2
# Cluster 2	3	2	4	1	10
# Cluster 3	0	1	0	0	1
Conventional (Mean=1,255; SD=172)	1,010-1,102	1,103-1,193	1,194-1,400	1,400-1,560	
Total # hh	12	9	10	13	44
# Cluster 1	0	6	3	2	11
# Cluster 2	11	3	5	8	27
# Cluster 3	1	0	2	3	6

6.4.2 Skills and capacities for pest and disease control

Reported incidence of diseases and pests also provided useful information for assessing the building of skills and capacities for coffee plantation management. A coffee disease commonly reported by Soppexcca members was anthracnosis.[47]

[47] Anthracnosis (*Colletothichum* spp) is caused by a fungus that attacks plant parts that are weak, diseased, or damaged. It is more common in plants that are stressed due to having too high a fruit load

Anthracnosis causes reductions in productivity (up to 70%) and ultimately kills coffee trees. A coffee tree is most vulnerable to the disease when production is high in a given year, relative to the nutrition available to the tree. However, the effects of the disease can be partially contained with effective pruning and shade management. Sixty-one sampled households (21% identified one or more outbreaks of anthracnosis during the assessment period (table 29). Anthracnosis was most common among households in cluster 1 (n=17, 22% of cluster), followed by households in cluster 2 (n=35, 22%), and cluster 3 (n=9, 17%). These data provide additional evidence that the upgrading of skills and capacities related to relatively complex aspects of coffee production (e.g., pruning, shade management, soil management) have not been achieved for a significant segment of the sample.

Table 28. Reported incidence of anthracnosis in coffee production

Cluster	Organic			Conventional			Total
	Average productivity*			Average productivity*			
	Low	Medium	High	Low	Medium	High	
1	2	3	3	4	1	4	17
2	3	0	6	1	8	17	35
3	0	0	3	0	0	6	9
Total	5	3	12	5	9	27	61

* Five-year average between 2004–2005 and 2008–2009. Low = 0-999 lbs-wet parchment coffee per year; medium=1,000–1,599 lbs wet parchment coffee per year; high=1600+ lbs wet parchment coffee per year.

Another indicator of increased skills for enhancing coffee productivity was improved control for coffee borer beetle (*Hypothenemus hampei*).[48] Overall, the households reporting a major productivity loss due to the coffee borer was limited (n=6). Part of reason behind the relatively low incidence of major productivity loses from the coffee borer beetle was the use of specific control practices. These included: 1) removal of green and red coffee berries before and after the main harvest period and 2) use of traps to capture the beetle. Among the 220 sampled conventional households, 194 reported removing berries before and after main harvest. Among these, more than half (101 households) reported to have acquired the practice due to

for the level of fertilization being applied. Key factors that determine risk to anthracnosis are production level, shade and fertilization. Prolonged periods of rain can also increase the risk of an infestation. Pruning helps reduce the impacts of the disease by removing infected material after the harvest (thus, reducing inoculum for the new harvest). As shade regulates the crop and reduces the nutritional demand of the coffee, it reduces the incidence, but even with shade it can be common if there is a reasonable crop but no fertilization. It was very common during the coffee crisis, when plants were trying to produce but households could not afford to apply fertilizer. The same can be expected when fertilizer costs are very high.

[48] The following cultural measures reduce infestation: reduce heavy shade; prune to keep the tree as open as possible; picking should take place at least once a week during harvest season and once a month at other times; as few berries as possible should be left on the ground; all infested berries should be destroyed; and before a main flowering, the crop should be stripped completely (Crowe 2004).

Soppexcca technical assistance. Among the 71 sampled organically certified households, all reported to remove berries before and after main harvest, with roughly 44% attributing the practice to technical assistance and training received from Soppexcca and the remaining 56% from other sources. Fewer households reported the use of traps for the elimination of the beetle: 40 conventional households and 19 organic households. In the majority of these cases, the design and use of traps was attributed to technical assistance and training, mostly provided by Soppexcca.

6.4.3 Skills and attitudes for enhancing coffee quality

The quality of parchment coffee derives, in part, from specific actions taken by producers.[49] These include, for example, selective harvest of coffee cherries, effective shade management, reduced agrochemical use, and appropriate control of the fermentation process. Upgrading the skills and capacities of households for carrying out these activities was a major focus of Soppexcca technical assistance and training. During interviews, households (n=247) responded to the open-ended question: "What changes have you implemented over the past five years to improve the quality of the coffee you produce?" The question allowed for insights into how the households interpreted the concept of quality, as well as their ability (and willingness) to implement quality-enhancing measures.[50] Households responded in one of two ways: 1) indicated one or more measures taken, where the measures could have had a positive effect on quality (n=153) or 2) did not identify any action taken (either because they did apply quality control measures or because they did so prior to the assessment period) or identified actions related to productivity and not quality (e.g., increased fertilizer use) (n=94). The discussion below focused on the first response type.

Fifty-four reported having adopted selective harvesting during the assessment period. The vast majority of these households were from clusters 2 (n=31) and 3 (n=12). Six households from cluster 1 identified selected harvest as one of their efforts for improved quality. A smaller number of households identified improved wet milling to improve their quality of parchment coffee. This implies proper fermentation times, identification and removal of defective or unripe beans, and proper calibration

[49] Following Dries et al. (2006), quality is considered to encompass all the desirable characteristics a product is perceived to have. This approach leaves a wide scope for interpretation: quality can mean conforming to standards (including standards pertaining to the environment, local specialities, organic production, ethics, and even taste and smell) and it can refer to subjectively perceived quality attributes.

[50] During pretesting and a first stage of interviewing, households were asked specific questions about production and postharvest management. However, there was little variation in the responses across households. Based on an understanding of the context, there was reason to think that answers were biased due to the importance of quality to Soppexcca (and access to Soppexcca as a buyer of their coffee). Recognizing this potential bias, and also the fact that we were unable to observe harvesting techniques and postharvest management firsthand, the use of an open-ended question was considered most appropriate.

of depulping machines, among other practices. Eighteen households identified improved attention to wet-milling processes, of which 10 were from cluster 2 and eight from cluster 3. Eighteen households—all belonging to clusters 1 and 2—identified increased attention to shade management and pruning as a central part of their effort to improve the quality. Sixteen households identified the adaptation of practices for control of the coffee borer beetle to improve quality, half from cluster 2 and half from clusters 3 and 1. Many households (n=45, 18% of the sample) linked quality with their low (or reduced) application of external production inputs, such as fertilizers and herbicides. The majority of these households were from cluster 1 (n=22) and cluster 2 (n=19). The following quote from an interviewed household exemplified positive attitudes toward quality by households from clusters 1 and 2: "We have been traditional producers who do not apply chemical inputs; we remove weeds by hand, we harvest the ripe cherries, we do not mix garbage in the bags, and we keep the baskets and sacks clean."

6.4.4 Skills and capacities for production of other agricultural products

Among a subset of sampled households (n=86), agricultural production expended during the five-year assessment period. In most cases, expansion was limited to a handful of low-value products traditionally produced by smallholders in Nicaragua (n=42), such as basic grains, citrus, and bananas. In other cases, expansion included nontraditional products (n=44), such as cocoa, taro root, goat rearing, and honey. Citrus and banana expansion took place in coffee plantations and required limited cash investments or investments in building human capital. The same was not true for expansion in nontraditionals, and in these cases, Soppexcca (e.g., cocoa and goat rearing) and local NGOs (e.g., honey and taro root) played an important role in facilitating the necessary investments. Most common among the nontraditional products was cocoa, which had been a priority of Soppexcca's technical assistance since 2008.

Twenty-eight households initiated cocoa production in 2007–2008 (table 30). Roughly 40% of them were organically certified households. Nearly 8% of cluster 1 households invested in establishing cocoa production. There was also strong participation in establishing cocoa by households in clusters 2 (10%) and 3 (11%). In most cases, cocoa was added to existing coffee plantations, thus providing an additional source of shade. Evidence suggested that Soppexcca played a major role in upgrading the skills to carry out basic cocoa production practices. In all but one case, Soppexcca donated the seedlings for establishing the cocoa plantations. It also provided technical assistance. The fact that organic producers feature so prominently

among the households taking up cocoa production likely reflects the interest by Soppexcca in increasing the incomes of its organic suppliers (and thus reducing the risk that they would exit organic production). Soppexcca also provided long-term credit to nearly 50% of the households (n=13) to cover the fixed costs of establishing the cocoa plantation.

Table 29. Households that initiated cocoa production

Cluster	Organically certified	Conventional	Total	% of total cluster membership
1	3	3	6	7.8
2	6	10	16	9.9
3	2	4	6	11.3
Total	11	13	28	9.6

Eight households established new taro root plantations on their farms. Only recently did the export market for taro root emerge in Nicaragua, due mainly to actions by NGOs and a few large agricultural exporters in Nicaragua to supply the US ethnic market with taro root following the demise of production in the Dominican Republic (Donovan 2009). In most cases, the area in which taro root was planted was small (0.25 mz), and in all cases, no external support was provided. One household expanded into honey production, for which, a government agency donated basic equipment and a local NGO played a key role in providing technical assistance and market outlets.

6.4.5 Role of technical assistance in building human capital

Evidence presented thus far suggests that most households faced major limitations to upgrading their skills and capacities for coffee production, to some extent reflecting limitations in the design and implementation of technical assistance programs by Soppexcca. Analysis of the role of technical assistance in building human capital considered the perceived usefulness of Soppexcca-provided technical assistance provided over the past two years (2007–2008 and 2008–2009) and the ability of households to follow recommendations provided by Soppexcca extensionists, as reported by sampled households.

For most households, Soppexcca was the only provider of on-site technical assistance during the assessment period. Sampled households were asked to report their perceptions on the usefulness of technical assistance for coffee production between 2007–2008 and 2008–2009. Among the sampled households, 55.7% (n=162) reported satisfaction with technical assistance during the two-year period. The remaining 44.3% (n=129) reported some type of grievance with technical

assistance provision. Responses from households shed light on the extent of the problem:

- Household #26: “We were visited once in 2008, but he didn’t provide technical advice; he arrived to inform us of a meeting at the cooperative.”
- Household #48: “The technicians have been absent. They give me credit without making an estimation of my harvest.”
- Household #61: “The extensionist never arrived to visit the coffee plantation. Once I requested that he visit the plantation, but he never came.”
- Household #265: “I lack technical recommendations when I need them: on one occasion I requested a visit from the extensionist because the coffee berries were falling off the branches, but he never arrived.”
- Household #187: “He only comes to estimate the harvest. When training events are carried out, I am able to consult with the extensionist—that is how I have obtained technical assistance.”
- Household #277: “Visits are only for estimating the harvest—the extensionist does not know my coffee plantation. He sends others from the community to assist me and does not provide recommendations.”
- Household #281: “The extensionist only comes to make estimates of the harvest, and when does arrive, he is not able to take much time to explain what needs to be done.”
- Household #282: “Sometimes he indicated which product I should use, but the extensionist did not indicate the doses and I burned the plants.”
- Household #290: “The extensionist provides useful recommendations, but he is not able to service all of the (base cooperative) members. I wish he would visit more.”

Those households that reported having received recommendations by extensionists during the two-year period also evaluated their ability to respond to the recommendations. Thirty-two households considered that their ability to respond was very high, while another 134 households considered their ability to be high. However, caution is warranted in assessing these responses, as extensionists may not have recommended practices or inputs, even if they were needed, knowing that the household’s ability to respond was minimal. In this sense, negative responses may provide more insight into 1) the challenges of building human capital when other forms of capital are not present and 2) the limits of current approaches by Soppexcca to technical assistance aimed at building human capital. Sixty-four households considered that their ability to respond was limited, while 20 considered that their

ability was very limited. Analysis of responses suggests that asset constraints and limited ability to understand the recommendations were key factors:

- Household #132: “I have not had the time to respond to the recommendations.”
- Household #114: “I have not applied fertilizer for lack of money or the other recommended activities for lack of labour.”
- Household #277: “I have not understood the recommendations.”
- Household #14: “Actually, I have not been able to act on the recommendations for applying fertilizer because I did not make the request for fertilizer (with Soppexcca) in time.”
- Household #243: “I have not comprehended the information that is presented to me.”
- Household #47: “I have not had the inputs, or the money required. By money, I mean money to pay for labour.”

6.4.6 Capacities of female-headed households for intensifying coffee production

Traditionally, both men and women are actively involved in coffee production. Men typically take charge of pruning, fertilization, and fermentation, while women are actively involved in harvest and in providing food for labourers. In addition to coffee production, female household heads are responsible for household maintenance, while male heads are reasonable for the production of corn, beans, and other staple crops. In this context, the absence of men (divorce, death, or abandonment) from the household can have serious implications for the ability to a household to actively participate in and benefit from coffee production. Evidence indicated that female-headed households struggled to achieve productivity levels at par with those of two-headed households, suggesting large trade-offs between off-farm labour and household maintenance, on the one hand, and coffee production and other cash-crop production on the other.

Females led 42 (14%) of the sampled households (table 31). In 11 of these cases, the absence of the male was due to death from natural causes or from accident. Divorce or long-term separation was reported in 15 of the cases, and in remaining cases, a male never entered the household. Average coffee productivity (2004–2005 to 2008–2009) of female-headed households in cluster 1 was roughly 40% lower than the average productivity of all cluster 1 members (for all members). Roughly 12% of the membership of cluster 2 was made up of female-headed households. In the case of conventional producers in cluster 2, evidence suggested that they were able to dedicate more resources to coffee production and thus

maintain productivity levels more in-line with the average for all conventional cluster members. In the case of organically certified members, however, productivity levels were 66% less than those of all organically certified cluster members. Three households from cluster 3 were single-headed households. Similar to organically certified households from cluster 2, the average productivity levels of female-headed organically certified households from cluster 3 was considerably lower than that of all organically certified cluster members.

Table 30. Coffee productivity for women-headed households

	# female headed	% total cluster membership	Comparison of productivity		
			Average coffee productivity of single-headed households*	Average coffee productivity of all sampled households*	% difference
Cluster 1					
Conventional	11	22.4	652	919	-34.0
Organically certified	8	28.6	482	824	-52.4
Total	19	24.7	578	884	-41.9
Cluster 2					
Conventional	17	13.3	1,775	2,003	-12.1
Organically certified	3	9.1	551	1,101	-66.6
Total	20	12.4	1,530	1,830	-17.9
Cluster 3					
Conventional	1	2.3	2,462	2,945	-17.9
Organically certified	2	66.7	560	1,549	-93.8
Total	3	5.7	1,511	2,654	-54.9

* Five-year average productivity estimates (2004–2005 to 2008–2009) for wet parchment coffee, reported in pounds/manzana.

6.4.7 Summary

Changes in key indicators for human capital during the assessment period:

- Roughly 24% of the sampled households did not acquire the skills or capacity to apply good production practices for coffee. This was reflected by their five-year average productivity levels below 1,000 lbs/manzana.
- Households demonstrated their ability to adopt practices for controlling pests and diseases when the solution was intuitive and the costs were low (e.g., coffee borer beetle). However, when technical knowledge was needed to identify the problem and external inputs needed to remedy the problem, they faced major difficulties in responding and suffered major reduction in production, and in some cases, in plantation health (e.g., anthracnosis).

- Across all clusters, evidence suggested that households were generally aware that it was import to achieve higher quality. Most households had taken some steps to enhance quality by, for example, selective harvest and improved fermentation techniques. This highlighted the ability of Soppexcca staff to induce change when the costs were relatively low in terms of human capital upgrading.
- Expansion of on-farm productivity activities was limited to 29% of the sampled households. Expansion into nontraditional, often higher-value, crops was carried out by about half of these households. Where expansion into nontraditional crops did occur, evidence suggested that Soppexcca played a major role in facilitating the expansion, providing technical assistance and credit and offering future market outlets.
- Soppexcca's technical assistance program faced major limitations to building human capital among households in clusters 1 and 2 as related to good production practices in plantation management. Evidenced suggested that support was spread too thin, was incomplete (e.g., not linked with other services, such as credit, and faced challenges to respond to the needs of households.
- Female-headed households faced major challenges to intensifying their coffee production. Soppexcca's current service offer had little potential to address the challenges they faced: they were too vulnerable to receive credit, had too few assets to invest in hired labour and other inputs, and found that the trade-offs for intensifying household labour for coffee were too high. A major benefit for these households' participation in Soppexcca was reduced vulnerability through the floor price of fair trade.
- Overall, school attendance among households' dependents was high. While some evidence of a gender bias existed in school attendance, the bias was limited. Among members of clusters 1 and 2, Soppexcca support for education provided a facilitative role in promoting school attendance. However, this research was not able to address the critical question of the quality of the education and ability to apply skills in off-farm employment. Secondary information suggests that the quality of rural education in Nicaragua is subpar.

6.5 Changes in social capital endowment

This section explores changes in social capital endowment for the production and marketing of coffee. When looking at social capital from the household perspective,

Soppexcca is viewed as one among several possible outlets for the marketing of coffee. Each outlet presents a unique set of advantages and disadvantages. In this sense, asset-poor households may benefit from diversified buyer portfolios, even when some of these contacts may offer terms less favourable than Soppexcca's. Discussions here explore the ties that bind the sampled households to coffee buyers.

6.5.1 Changes in number and nature of ties with coffee buyers

Prior to joining Soppexcca, the majority of sampled households maintained buying relationships with a single coffee buyer, and in most cases this buyer was a local intermediary (table 32). In the case of households from cluster 1, nearly 55% sold their parchment coffee exclusively to local intermediaries, mainly those based in the markets of Jinotega and Matagalpa. Some households (7.8%) sold exclusively to the Jiprocoop cooperative (the predecessor to Soppexcca), while another 7.8% sold exclusively to exporters. The rest of the households sold to a mix of buyer types (usually a mix between local intermediaries and exporters) or were not producing coffee prior to joining Soppexcca. Relationships with buyers were similar for cluster 2, with the major difference being that a higher percentage of households sold exclusively to exporters (13% compared to 8% for cluster 1). Results for cluster 3 were different from the other two clusters in various ways: 1) a significantly lower percentage of households sold exclusively to local intermediaries, 2) a higher percentage of households sold exclusively to exporters, and 3) nearly one-third of the households sold to various types of buyers, thus allowing for diversification of risks and access to credit under different conditions.

Table 31. Marketing relationships for coffee before joining Soppexcca

	Cluster 1		Cluster 2		Cluster 3		Total
	#	%	#	%	#	%	
100% sold to cooperatives	6	7.8	12	7.5	3	5.7	21
100% sold to exporters	6	7.8	21	13.4	13	24.5	40
100% sold to local intermediaries (including market)	42	54.6	86	53.4	18	34.0	146
Diversified buyer portfolio (mix of cooperatives, exporters, and local intermediaries)	7	9.1	9	5.6	17	32.1	32
No coffee production prior to joining Soppexcca	16	20.8	33	20.5	2	3.8	51
	77	100.0	161	100.0	52	100.0	290

Sampled households also reported services provided by the different buyer types to which they sold coffee prior to their having joined Soppexcca. Results indicated that, overall, 1) few had access to markets for certified coffee and 2) access

to technical assistance and credit was highly limited for households that sold to buyers other than cooperatives. Fifty-six households reported selling to exporters (40 exclusively and 16 as part of a diversified buyer portfolio). A relatively small percentage of households reported having received credit (19.6%, n=11) and even fewer reported having received technical assistance (8.9%, n=5). Thirty households reported selling to a cooperative (21 exclusively and nine as part of a diversified buyer portfolio). The cooperative in this case was Jiprocoop (which was certified fair trade), the predecessor to Soppexcca (see section 1.5.3 for details). As expected, households that sold to a cooperative reported greater access to technical assistance (86.7%, n=26), credit (76.7%, n=23), and assistance with the purchase of inputs (53.3%, n=16). One hundred and sixty-eight households reported selling to local intermediaries (146 exclusively and 22 as part of a diversified buyer portfolio). Thirty-two of these households reported access to credit from intermediaries (19%), while another 17 reported assistance with transportation (10.1%).

For many households, transportation of their coffee to the buyer implied both risk and considerable out-of-pocket expense. In general, households shipped their bags of parchment coffee to Soppexcca via public transportation. Often stored on top of the bus, their coffee was exposed to the rain, delays from mechanical failure, and contamination from other goods (fig. 8). Extensive exposure to moisture leads to mould growth, which results in price penalties or outright rejection at the Soppexcca warehouse in the name of quality control. In some cases, households reported hauling coffee to the bus stop only to be informed that the bus was already full and that they would have to wait until the following day to load their coffee. In these conditions, access to buyer-provided transportation services for coffee represented an important service for reducing marketing costs.

Fig. 8. Risks for marketing coffee related to public transportation: example from the road between Los Alpes and Jinotega (April 2009)

Diversification of relationships with coffee buyers

Sampled households used various options for selling parchment coffee, including selling to buyers in the Jinotega and Matagalpa markets, to direct coffee exporters, to high-volume local intermediaries, and to Soppexcca. Each buyer type implies a unique set of benefits and costs from the perspective of coffee-growing households (table 33). Most sampled households maintained relations with at least two buyer types, one of which was Soppexcca. In some cases, relationships existed with three buyer types.

Market buyers offer producers cash in hand upon delivery of parchment coffee. Most buyers purchase coffee with a mixture of their own capital and financing provided by direct exporters. Prices are set by direct exporters, with market buyers receiving a commission for each bag delivered to the exporter. Market buyers provided various types of services to their suppliers of raw material. Most of the market buyers provided credit (n=14, 77.7% of the sampled buyers). The average size of the total credit portfolio of these buyers for the 2008–2009 production year was US$18,223. Not all coffee producers received credit; on average, roughly 60% of producers were reported by buyers to have received credit. Requirements for credit varied across buyers and according by the size of the credit, but in general, for relatively small amounts of credit, the conditions were accessible—for example, providing a photocopy of their national identification card or receipt for a motor. The average interest rate was high at 3.5% per month. However, in many cases, no

interest was charged for credit taken out between November and December (thus providing low-cost access to cash for covering harvest-related expenses). The fact that most coffee buyers were also buyers of basic grains allowed for flexibility in repayment: if the coffee harvest fell short, producers could pay with the basic grains harvest.

Interviews with market buyers suggested that nearly all had increased their quality requirements over the assessment period; however, the requirements were relatively low. The most common change identified by market buyers was a reluctance to purchase mixed coffee (parchment coffee derived from both ripe and unripe berries). Other changes included increased scrutiny for coffee with a large percentage of physical defects (e.g., holes from the coffee borer beetle) or improperly fermented[51] or musty/mouldy beans. In most cases, coffee with a relatively high percentage of defects is purchased, but at a reduced price. There was mixed evidence on how the quality of coffee purchased has changed since 2005: 10 sampled buyers (55.6%) reported that the overall quality of the coffee they received had improved in recent years; seven reported that overall quality had decreased, while three reported no change. In cases where buyers reported improved quality, efforts by cooperatives to improve quality were cited as a possible contributing factor.

[51] After depulping coffee cherries to remove the skin and some of the pulp, the separated seed will still have a significant amount of pulp attached. The remaining pulp is loosened by fermentation, allowing it to be washed away before drying. If fermentation is not stopped as soon as the remaining parchment is no longer slimy and has a rough texture, the coffee acquires undesirable flavours.

Table 32. Characteristics of trading relationships for coffee sold by Soppexcca-affiliated households

Buyer	Services offered	Quality requirement	Conditions
Market buyers in Jinotega and Matagalpa*	Purchase of coffee Short-term credit Exchange of basic food items for parchment coffee (before and after harvest)	++	Flexibility in credit repayment (paying coffee debt with basic grains production) No interest on credit taken prior to harvest; 5%/month interest on all other loans Full payment upon delivery Price to producer: exporter price, minus commission Emergency credit (with interest)
Locally embedded intermediaries	Technical assistance Short-term credit Fertilizer (delivered) Transport	++	Land title not required for credit Interest rate at 1.5%–2%/month Full payment upon delivery, price based on New York market price
Direct exporters (CISA Exporta-dora, Exportadora Atlantic)	Short-term credit	++	Contract and land title required for credit Interest rate 1.5%–2%/month Final payment upon delivery, priced based on New York market price
Soppexcca	Technical assistance Certification Fertilizer (delivered) Short- and long-term credit Emergency credit Other services Access to projects	+++	Land title not required for credit Floor price (fair trade) Organic certification requirements (organically certified members only) Interest rate 1.2%/month Partial payment upon delivery, final payment in June Emergency credit (with/without interest) Other services**

* Information based on results from 18 key informant interviews carried out on-site with buyers of coffee at the markets of Jinotega and Matagalpa in August 2009
** For example, emergency transport to hospital or donations for funeral expenses

Locally embedded intermediaries depended on direct exporters for access to international coffee markets, but because they tended to have closer contacts with the communities that produce coffee, they were able to offer services that other buyers were unable to provide. During interviews with households, the name Osman Gutierrez was mentioned repeatedly by households from the three base cooperatives Osman Martinez, Ernesto Acuña, and La Unión. Next to Soppexcca, Osman Gutierrez provided the most extensive services for coffee-growing households. [52]

[52] In 2008–2009, Osman Gutierrez purchased coffee from approximately 550 households in selected communities in Jinotega. Several of these households were members of Soppexcca. Interviewed households expressed strong bonds with Osman Gutierrez. Prior to their membership with Soppexcca, households depended on Osman Gutierrez for the purchase of their coffee and for the provision of credit and agricultural inputs. Credit was provided without formal land titles or other forms of collateral. In 2008–2009, a total of US$325,000 was offered in credit at 18% per year, with 90% of producers receiving credit. Up to 50% of the anticipated value of coffee was provided as credit. Quality requirements were established by the exporters but are generally in-line with those required by other buyers (limited tolerance for beans that are mouldy, overfermented, or insect damaged). Like market

Among households in the Osman Martinez base cooperative, relations with Osman Gutierrez were established prior to joining Soppexcca, and he was clearly identified as their primary buyer of coffee (with Soppexcca providing a supplemental source of credit and secondary market outlet).

Relatively few sampled household maintained relationships with direct exporters of coffee (n=5). Prices offered by direct exporters for first and second quality coffee fluctuate in relation to chains in the New York commodity market. Annual credit was provided based on a contract, with land titles generally required as collateral (in cases where producers have a history of compliance with contractual obligations, land titles may not be required). Credit during the 2008–2009 production year was offered at a 17% annual interest rate. Producers have the option to receive final payment (market price minus amount of annual credit) upon delivery of parchment coffee. Additional services, such as on-site technical assistance and transportation, were not reported.

Soppexcca only purchased first quality coffee. In 2008–2009, credit was available to most members at annual interest of 16% for short-term credit and 14% for long-term credit. Soppexcca also provided credit for emergencies at the same short-term interest rate. In addition, it provided credit for the purchase (or donation, in especially needy cases) of the coffin in the case of the death of a member. Among the coffee buyers discussed here, Soppexcca was the only one that offered long-term credit. It was also the only one that offered access to certification. Its technical assistance services were expanded in 2007. For Soppexcca-affiliated producers that received short-term credit, coffee was paid in three instalments: 63% in June (in the form of credit), 18% upon delivery of parchment coffee at the Soppexcca headquarters (between December and March), and the remaining 18.8% following the export of green coffee to buyers in the United States and Europe. The final payment takes place between May and June. In addition to services for the production and marketing of coffee, Soppexcca also provided access to development projects, which have played a role in expanding the options available for agricultural production (e.g., cocoa, small livestock), as well as in reducing the costs of education, for example.

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buyers, he purchased all grades of coffee and provided no-interest credit for food just prior to the harvest period. Gutierrez covered costs for picking up coffee, thus allowing producers to avoid the expense and risk of transport. During 2009, prices were based on the New York commodity market and, in the case of first quality parchment coffee, ranged from a high of US$0.564 to a low of US$0.436. For Soppexcca members, relations with Osman Gutierrez offered certain benefits, such as access to transport, an additional source of low-risk credit, and lower transaction costs (e.g., no paperwork for receiving credit and no trips to Soppexcca's office for receiving payments).

Sales of coffee to Soppexcca and other coffee buyers

Evidence suggested that Soppexcca was an important buyer for a majority of the households. For organically certified households, the mean percentage of coffee sold to Soppexcca was 73.1, while for conventional producers, the mean percentage was 57.2 (table 34). A two-way between-groups analysis of variance was conducted to explore the impact of cluster membership and production type on levels of side selling. The interaction effect between cluster and production type was not statistically significant, $F(2, 289)=0.242$, $p=0.785$. There was a statistically significant main effect for production type, $F(1, 89)=13.715$, $p=0.00$; however, the effective size was small (partial eta squared=0.046). The main effect for cluster, $F(1,298)=0.479$, $p=0.620$, did not reach statistical significance.

Table 33. Percentage of coffee sold to Soppexcca

Cluster	Percentage of parchment coffee sold to Soppexcca *	N	SD	Median
Organically certified				
1	69.99b**	27	33.29	81.75
2	74.48b	32	22.47	76.25
3	76.95b	10	28.98	91.49
Total	73.08	69	27.78	79.05
Conventional				
1	54.55a	50	32.82	54.27
2	59.48a	128	30.86	66.19
3	53.51a	43	33.94	63.86
Total	57.20	221	31.89	64.17

* Average percentage of production sold to Soppexcca from 2005–2006 to 2007–2008
** Means with the same letter are not significantly different

Evidence here suggested that price was not the major factor behind selling to buyers other than Soppexcca. Households were asked their motivations for selling coffee to other buyers, and their responses, presented below, illustrate diverse reasons. The most common response related to the need to cover production expenses for the coffee harvest (n=31). Households also identified emergencies and expenses as the main reason for selling to buyers other than Soppexcca (n=8), poor quality (n=4), and limited access to credit (n=2). Below are quotes from households in cluster 1 (emphasis added):

- Household #171: “To pay for workers during harvest time, because the advance payment that Soppexcca provides is limited.”
- Household #126: “To cover basic needs during the harvest time, such as payment of workers and purchase of food.”

- Household #266: “Medical expenses; one of our boys got sick.”
- Household #24: “Because my brother needed money, so I sold coffee in the market to resolve his need.”
- Household #60: “To cover the costs of baskets for harvest, given that I didn’t make by request for credit from Soppexcca in time.”
- Household #108: “I did not owe Soppexcca any of my coffee harvest. I only sell to Soppexcca when the production is good. In these cases, I sell half to Soppexcca and half to others.”
- Household #137: “Low production and lack of money to send our children to classes in the first months of the year.”
- Household #166: “Our production was low. Had we delivered the production to Soppexcca, we would not have received any income because of our existing debt with Soppexcca.”

The most common type of response from cluster 2 related to the need to cover production expenses for the coffee harvest (n=59). Soppexcca’s strict quality requirements were also mentioned as a factor in their decision to sell to other buyers (n=19). Several households identified better prices and other services (n=8). The need to cover household-related expenses was also common (n=18). Below are quotes from households in cluster 2 (emphasis added):

- Household #162: “The amount of advance [credit] provided by Soppexcca does not cover the costs of hiring coffee pickers.”
- Household #253: “To cover the costs for construction of a house, given that la final payment by Soppexcca is late.”
- Household #145: “The final payment is very late, and there’s a need to pay coffee pickers; also, it has happened that our coffee has been too humid to pass inspection by Soppexcca.”
- Household #188: “Due to delays in the provision of credit—the intermediary is much quicker. Soppexcca always delivers credit in June, while the intermediary delivers in May.”
- Household #195: “I do not have credit with Soppexcca because I do not have a national identification card. Osman Gutierrez provides me credit, and it is for this reason that I sell him coffee”
- Household #190: “Mr. Osman Gutierrez pays better than Soppexcca; Soppexcca has too many price deductions, and Mr. Gutierrez is less concerned with quality.”

- Household #245: “Final payment is very late and in CISA (exporter) final payment is early.”

As before, the most common response from cluster 3 related to the need to cover production expenses for the coffee harvest (n=20). In other cases, households identified the strict quality requirements imposed by Soppexcca and its buyers as the main reason for selling to other buyers (n=8). Other motivations included: need to cover household expenditures (n=2) and better conditions provided by other buyers (n=7). Below are quotes from households in cluster 3 (emphasis added):

- Household #3: “Soppexcca demands too much quality and due to only a few imperfect beans they will pay you the price for second-quality coffee.”
- Household #19: “The amount of credit offered by Soppexcca is very low and through my relations with [the direct coffee exporter] Atlantic I receive US$10,000. I have not received any credit from Soppexca. Soppexcca also demands too much in terms of quality.”
- Household #185: “Osman Gutierrez offers the same conditions as Soppexcca. I have a credit history with Osman and it is easy to sell him our coffee.”
- Household #194: “Transport is very difficult from our farm to the road. The other buyer collects our coffee at the farm.”
- Household #245: “Final payment is very late and payment from CISA [direct coffee exporter] is much quicker.”

6.5.2 Role of nonmarketing factors for building social capital with Soppexcca

Analysis thus far suggests that access to value chains for speciality coffee and related services for production and marketing only partially explain the ties between Soppexcca and its members. Analysis below suggests that the strength of these ties depends as much, if not more, on the ability of these services to increase members’ resilience to external shocks. These services may or may not relate to the marketing of coffee. It is in this regard that Soppexcca stands out from the other buyers mentioned above. Interviews with households revealed three ways in which Soppexcca-provided services increased resilience and provided incentives for the household to maintain its ties with Soppexcca: resilience to unexpected expenses (e.g., health complications and funeral expenses), income shortages and future asset erosion, as well as improved access to education for household dependents.

Resilience to unexpected expenses

Households were asked to evaluate their access to health care services. A significant percentage (29.2%) responded that attention at publicly provided health clinics had improved in recent years, with increased attendance by medical professionals and increased capacity to provide basic medicines. However, many of these households also reported that the range of treatments and variety of medicines available were limited and the supply of medicines was sporadic. Evidence showed that Soppexcca played an important role in 1) facilitating medical examinations and access to medical brigades and 2) providing donations and credit resources for the purchase of medicines and specialty treatments. In addition, Soppexcca provided credit and donations for households that suffered a death of a close relative. When asked if Soppexcca had facilitated their access to medical attention during the preview three years, 83 households responded affirmatively. For 29 households, attention included the female household head receiving one or more examinations for cervical cancer. For 54 households, facilitation included credit or donations for medical expenses and funeral expenses for one or more household members. Examples of household responses follow:

- Household #35: Credit of US$1,621 for operation in Managua following major accident; donation of coffin following death of wife.
- Household #13: Credit for US$108 for prostate operation.
- Household #202: No-interest credits of US$325 for emergency operation for wife.
- Household #240: Donation of coffin, bread, and coffee for funeral and burial of mother; donation of US$25 for covering related expenses.
- Household #213: Cervical cancer exam for mother; donation of US$162 following death of father.
- Household #214: Cervical cancer exam for wife; US$324 donation to cover medical expenses following accident. .
- Household #237: Donation of coffin and coverage of other funeral-related expenses following death of wife.
- Household #228: US$540 no-interest credit for eye operation.
- Household #253: Cervical cancer exam for wife; when mother was sick, Soppexcca provided transport to the town of Jinotega for treatment; following death of mother, donation of coffin and coverage of other funeral-related expenses.
- Household #292: Donation of coffin and coverage of other funeral-related expenses following death of wife; assistance with food for children.

Resilience to income shortages

Resilience to income shortages refers to the ability of households to cover critical household-related expenses and/or cover critical production-related expenses at times when income flows are nonexistent or otherwise highly constrained. Asset-poor coffee producers can be considered especially prone to such constraints, given that related income flows are generated during a relatively short period during the year, while production-related expenses occur throughout the year. Access to credit was important for addressing income shortfalls. While it was not feasible to ask households about their use of credit, interviews brought to light that short-term credit was used for overcoming consumption shortfalls, first, and for coffee production, second. While other coffee buyers offered credit, in most cases the terms placed asset-poor households at risk of 1) land-title seizure or 2) extremely high interest rates for prolonged periods. Soppexcca credit was provided at favourable rates (see section 6.5 for details) and with the understanding that delays in repayment could be addressed with future coffee harvests at the same rate.

Soppexcca was the first and only source of credit for most households during the assessment period. Prior to their joining Soppexcca, only 20% of cluster 1 households had access to credit, while nearly 40% of cluster 2 members had access (table 35). In both cases, access was provided mainly by local intermediaries (market buyers), and in limited cases through NGOs. Cluster 3 members generally had access through commercial banks. In most cases, the reason stated for not using credit was fear of noncompliance with the credit terms and the related possibility of losing their land. In many other cases, the reason was an inability to comply with the credit conditions, namely a formal land title. In a few cases, households reported a limited understanding of the supply of credit. During recent years, however, the percentage of households in clusters 1 and 2 with access to at least one provider of short-term credit increased significantly, from 26% to 85% in cluster 1 and from 40% to 85% in cluster 2. In most cases, the sole provider of credit was Soppexcca (for details on credit supply, see sections 6.7.2 and 6.7.3).

Table 34. Increase in access to short-term credit for households

Cluster	Number of short-term credit sources reported by sampled household (n=291) for the period between 2004–2005 and 2008–2009								Households with at least one credit source during the two years prior to joining Soppexcca	
	1		2		3		Total		#	%
	#	%	#	%	#	%	#	%		
1	52	67.5	12	15.6	1	1.5	65	84.6	20	26.0
2	106	65.8	26	16.1	5	3.1	137	85.0	64	39.8
3	27	50.9	20	37.7	2	3.8	49	92.4	43	79.2

Soppexcca's success in attracting asset-poor producers to its credit programs lay in the design of its credit program (that was backed with NGO support). The repercussions for noncompliance with credit conditions vary according to the lender. In the case of local intermediaries, extensions of the credit period or repayment with other crops may be an option, but in both cases, these options represent significant direct costs and present future risks and trade-offs. Access to credit through exporters or commercial banks generally requires the surrender of a land title as collateral. The high costs of intermediary-provided credit and the high risk related to bank-provided credit partially explain why so few households had access to commercial banks prior to joining Soppexcca (other reasons may be limited willingness of commercial banks and coffee exporters to lend to smallholders). Soppexcca gave credit to its members without the requirement of a land title as collateral. When credit was not repaid fully in a given year, an understanding existed among households and Soppexcca that the unpaid debt would be carried over to the next production year.

The importance of credit in terms of social capital came through in the following quotes from sampled households (in response to the question: What is your overall level of satisfaction with Soppexcca and why?):

- Household #34: "Soppexcca helps to resolve difficulties (for coffee production), like credit. The selling of coffee is quick, but…the price paid is not what one would expect—the price paid does not reflect the quality that we deliver."
- Household #52: "We have received benefits, such as training and credit, and Soppexcca does not embargo our land titles when we are late paying our credit."
- Household #91: "The ease of access and the trust involved in receiving credit. We are sure that they [Soppexcca] won't take our land."
- Household #116: "When I had a credit need, Soppexcca helped me. They also provided assistance when my mother died."
- Household #264: "Access to credit has improved our income—how we are able to engage with others: we are better for being organized."
- Household #272: "Access to credit and the security that they [Soppexcca] will not take our coffee parcels. We work better being organized."
- Household #275: "The difference in prices offered by Soppexcca, in comparison with those offered in the market, are not much. Additionally, one has to wait for the final payment from Soppexcca. But, I consider that the credit does help us."

- Household #280: “Access to credit and inputs has been important. Before we had to leave to work in order to purchase fertilizer. Now Soppexcca provides us with credit.”
- Household #286: “Since we joined Soppexcca, we have felt like we are improving, given that without our organization, we would not have had credit or have produced coffee.”

Resilience to future asset erosion

For households belonging to the base cooperative Julio Hernandez, Soppexcca membership has provided critical resources for making coffee production possible (thus providing increased security of landholdings), and for those in El Esfuerzo, Soppexcca membership has provided hope for making future coffee production more viable. In both cases, households provided services to former coffee plantations, rather than being coffee producers themselves. Increasing the human and natural capital of these households has represented a major investment for Soppexcca. In the case of Julio Hernandez, prior to organizing their base cooperative for participation in Soppexcca, households had yet to market their coffee and directly receive the benefits. Their coffee was sold collectively to a local community member, with little understanding of the price he received in the market in Jinotega. It was not until 2005, with credit and technical assistance provided by Soppexcca, that the members began to invest in coffee production. Prior to 2005, no investments had been made in coffee production since the early 1990s (when the former state-owned plantation passed into the community’s hands). Thus, without Soppexcca intervention, it is likely that coffee production would have remained too low to be economically viable and producers would have had either to sell their land or focus on basic grain production. In the case of El Esfuerzo, as of 2009, Soppexcca was seeking external assistance to enable it to provide the base cooperative with a US$80,000 loan to pay its legal obligations, and thus received their collective land title (see section 6.3.6). The significance of Soppexcca support comes through in the following quotes from sampled households (in response to the question: What is your overall level of satisfaction with Soppexcca and why?):

- Household #139 (El Esfuerzo): “Credit for production, as well as the possibility of a credit to legalize or lands.”
- Household #151 (El Esfuerzo): “Soppexcca gave us the opportunity to have access to an organization and credit without having legal land titles—the earnings to the producer. Soppexcca supports us in many ways; it has

always helped us with family matters, especially health. In the future, we hope that Soppexcca will be able to resolve the legal problem."

- Household #268 (Julio Hernandez): "The opportunity to be better organized, with credit and training on how to manage coffee."
- Household #272 (Julio Hernandez): "Security that no one will remove us from our lands. I work better being better organized."
- Household #274 (Julio Hernandez): "Soppexcca responds to the needs of producers, providing credit and teaching how to better cultivate coffee."

Improved access to education for household dependents

In general, better-educated people use resources more efficiently and are more likely to innovate in production on and off of the farm. Education may also allow for entry in nonagricultural activities. The questions addressed here are to what extent did the dependants of Soppexcca-affiliated households have access to formal education, how did access to formal education vary across the sampled households, and what role, if any, did access to value chains for certified coffee play in facilitating access to education. Results show a difference in access to education based on gender and preexisting asset endowments. However, the magnitude of the difference was small. This likely reflected actions by the government[53] (e.g., elimination of enrolment fees and increased funding for rural education), combined with increased prices for coffee and support by Soppexcca and its members (e.g., provision of school supplies, construction of two primary schools).

Among the 203 households that had one or more female dependants, 141 (or 69.5%) reported schooling for all of their female dependants during the 2008–2009 academic year. Cluster 2 had the highest percentage of households reporting schooling for all female dependants (73.3%), followed by cluster 3 (68.9%) and cluster 1 (16.3%). Among the 182 households that had one or more male dependants, 137 (75.3%) reported schooling for all of their male dependents. Similar to the case of females, cluster 2 had the highest percentage of households reporting schooling by all male dependants (82.5%), followed by cluster 1 (69.4%) and cluster 3 (75.3%). An independent-samples t-test was conducted to compare school attendance rates by females and by males. There was a significant difference in the number of household members for females (mean=0.48; SD=0.892) and males

[53] In general, Nicaragua's performance in education is noteworthy for the high enrolment rates and the increases in such enrolment since 1990, rising from about 73% to almost 92% in 2006; however the primary completion rate during the same period increased by only 5 points, from 60% to 65% (ECLAC 2009). However, despite rather equitable access to primary school, substantial inequities exist in access and quality of preschool and postsecondary education. Nicaragua trails other Latin American countries in the quality of its primary and secondary education (Angel-Urdinola and Laguna 2008).

(mean=0.30; SD=0.578), with a t-statistic (383) equal to 2.316 (p=.021, two tailed). However, the magnitude of the difference in the means (mean difference =0.18, 95% CI: .026-.325) was small (eta squared=0.012). That is, only 1.2% of the variance in number of household members not attending school can be attributed to sex.

Attribution of school enrolment to participation in Soppexcca and the specialty coffee value chain was not possible. However, it was possible to identify the important supportive role played by Soppexcca and its donors in facilitating access to primary and secondary education. Since 2007, households have received a school package (notebook, backpack, and other supplies) at the start of each school year. In 2009, Soppexcca provided 25 scholarships for males and 19 scholarships for females to reduce the costs of secondary education (covering transportation and lodging expenses). During the same year, only 10 other households reported having received a scholarship from a source other than Soppexcca. In addition, Soppexcca provided the funding for the construction of two primary schools, with a combination of its own funds and fair-trade dividends (see fig. 9). It was beyond the scope of this research to assess the quality of the construction or the education received—however, from a social capital perspective, the investment in local communities by Soppexcca is noteworthy. The significance of these services was identified by households from clusters 1 and 2 when they were asked to identify major benefits from Soppexcca membership:

- Household #47 (cluster 2): “We have benefited from credit, but more than anything, from the scholarship for studies.”
- Household #126 (cluster 1): “They have helped us with the school packets and with credit.”
- Household #209 (cluster 2): “Help with basic necessities, such as school packages, uniforms, and during the coffee crisis, help with food.”
- Household #252 cluster 1): “Access to credit, scholarships, a higher price for coffee, and help with the school packets.”
- Household #268 (cluster 2): The offer of credit for maintaining coffee production and for health care, training, and scholarships for our two sons.”
- Household #277 (cluster 2): “Projects provided through Soppexcca, access to credit, and a scholarship for my husband to study accounting.”

Fig. 9. La Amistad primary school, constructed with funds from Soppexcca and fair-trade social premiums

6.5.3 Summary

Changes in key indicators for social capital during the assessment period:

- Various types of buyers maintained relations with the sampled households, each offering different services valued by the sampled households. Households sold to different buyers to meet different livelihood needs. In many cases, Soppexcca was not the primary buyer of coffee, despite its ability to offer higher prices and more favourable credit terms.
- Soppexcca's ability to increase its capture of raw material from members will require additional services that address livelihoods realities and needs, especially those related to income shortfalls (e.g., more agile payment, subsidies for strategic investments, highly targeted and rapid credit).
- Soppexcca did not replace preexisting linkages for coffee marketing. Rather, Soppexcca became one of several coffee buyers. Diversified linkages for coffee marketing emerged as a strategy to cover chronic income shortages.
- For most households, the strength of ties with Soppexcca lay in Soppexcca's ability to offer services that increase their resilience to chronic income shortfalls, asset erosion, and unanticipated expenses. Most other coffee buyers were unable to provide similar services.

6.6 Changes in physical capital endowment

Changes in physical capital endowments were assessed with the following three primary indicators: 1) expansion and improvement of wet-milling infrastructure, 2)

expansion and improvement of machinery, equipment, and tools, and 3) expansion and improvement of housing infrastructure.

6.6.1 Expansion of wet-milling infrastructure

Expansion or improvement of wet milling encompasses the construction (or refurbishment) of a mill enclosure (fig. 10), construction (or refurbishment) of the fermenting tanks, and the purchase (or repair) of machines for depulping and pumping water. While most investments were made at the household-level, some investments in wet-milling infrastructure were been made collectively, among a subset of households in a base cooperative or among all the members of a base cooperative. Three collective wet mills were constructed between 2004–2005 and 2008–2009: one for two members of Bernardino Diáz (US$6,607), one for all the members of Ernesto Acuña (US$56,000), and another for the members of Julio Hernandez (US$5,589). All of these expenditures in collective wet-milling infrastructure were facilitated by a long-term credit from Soppexcca, the costs of which were spread out among participating households in the form of individual three-year credits (to be repaid with the delivery of green coffee to Soppexcca).

Individual households invested US$137,958.59 in wet-milling infrastructure during the assessment period, of which US$113,686 was invested by households that produced conventional coffee and US$24,269 by households that produced organically certified coffee. Table 36 provides expenditures for wet-milling infrastructure made by individual households between 2004–2005 and 2008–2009. In general, data show that households in clusters 2 and 3 achieved considerable advances in their wet-milling capacities. Expenditures by cluster 2 households averaged US$822 (conventional producers) and US$825 (organically certified producers). Cluster 3 members producing conventional coffee reported an average investment of US$1,502, while investments by organically certified households averaged US$799. On the other hand, average investments by households in cluster 1 were markedly smaller. Among those in cluster 1 that produced conventional coffee, average investments totalled US$499, while those by organically certified households were US$563.

Fig. 10. Example of wet-milling infrastructure for coffee production financed with long-term credit from Soppexcca

Evidence suggested that the Soppexcca credit program contributed to investments in wet-milling infrastructure and machinery. Forty-three households—or 32% of all households that invested in construction/upgrading of wet-milling infrastructure and machinery—received short- or long-term credit that was used for construction/upgrading of wet-milling infrastructure and machinery. These households reported a total of US$97,847 in credit received between 2004–2005 and 2008–2009. In some cases, households reported using a percentage of long-term credit received for the renovation of coffee plantations and short-term credit received for the production of coffee to invest in physical capital. In addition, a strong focus on improving the quality of coffee and improved environmental stewardship by Soppexcca-provided extension services is likely to have encouraged some households to invest in more environmentally friendly forms of wet milling for the first time.

Table 35. Expenditures for infrastructure and machinery for wet milling of coffee (for individual household usage) between 2004–2005 and 2008–2009

Type of infrastructure or machinery	# of households making an investment	Total investment reported (US$)	Average investment (SD in parentheses) (US$)	Max reported investment (US$)
Cluster 1				
Conventional households				
Wet mill	2	671	335 (±474)	671
Depulper	5	2,761	552 (±506	1,397
Water pump	1	559	559 (na)	559
Total	8	3,991	499 (±434)	1,397
Organically certified households				
Wet mill	0	0	0	0
Depulper	4	2,253	563 (±298)	839
Water pump	0	0	0	0
Total	4	2,253	563 (±298)	839
Cluster 2				
Conventional households				
Wet mill	16	27,686	1,730 (±1,891)	6,987
Depulper	28	11,431	408 (±255)	1,118
Water pump	9	4,483	498 (±146)	866
Total	53	43,600	822 (±1,197)	6,987
Organically certified households				
Wet mill	5	7,099	1,420 (±1,228)	3,186
Depulper	10	5,198	5,205 (±259)	950
Water pump	2	1,733	866 (±909)	1,509
Total	17	14,029	825 (±797)	3,186
Cluster 3				
Conventional households				
Wet mill	18	49,318	2,740 (±2,650)	11,179
Depulper	14	10,915	780 (±310)	1,230
Water pump	12	5,864	489 (±228)	1,118
Total	44	66,097	1,502 (±1,979)	11,179
Organically certified households				
Wet mill	3	5,478	1,826 (±1,380)	3,354
Depulper	5	1,688	338 (±253)	671
Water pump	2	823	411 (±90)	475
Total	10	7,989	799 (±978)	3,354

6.6.2 Expansion of other machinery and tools

Sampled households reported their acquirement of machinery and tools (in addition to those used for wet milling) between 2004–2005 and 2008–2009. The largest investments in other machinery and tools were made by households that produced conventional coffee in clusters 2 and 3 (table 37). However, the mean investment for households in cluster 2 is markedly smaller than that of households in cluster 3. Overall, investments by conventional households were markedly larger than investments by organically certified households.

Table 36. Machinery and tool investments (in addition to wet-milling infrastructure and machinery), 2004–2005 to 2008–2009

Cluster	# of households making an investment	Total investment/ household (US$)	Mean investment/household (US$) (SD in parentheses)	Max investment/ household (US$)	Median investment/ household (US$)
Conventional households					
1 (n=49)	40	5,185	130 (±335)	1,945	29
2 (n=129)	103	34,084	331 (±917)	7,826	84
3 (n=43)	38	46,937	1,235 (±2645)	14,405	412
Total (n=221)	181	86,206	476 (±1449)	14,405	84
Organically certified households					
1 (n=28)	20	1,847	92 (±143)	637	58
2 (n=33)	24	4,642	193 (±439)	2,096	63
3 (n=10)	11	6,639	603 (±850)	2,907	313
Total (n=71)	55	13,127	239 (±509)	2,907	67

In general, findings suggest that households from cluster 1 and 2 struggled to build their physical capital endowments for on-farm production. For these households that made acquisitions, support from NGOs often made the acquisition possible. Among the 48 households that produced conventional coffee in cluster 1, 40 acquired new machinery and tools,[54] and eight did not report any change in endowment of other machinery or tools during the assessment period. Among those households that increased their endowment, the mean cash investment was roughly US$129. Given the high level of variation in the sample, the median value is also reported (US$28.65). Among the 20 organically certified households in cluster 1, the mean investment, about US$92, was somewhat lower than the mean investment for conventional households of the same cluster. The largest purchase was for US$637 for the construction of a goat corral, using funds donated by a local NGO.

Among the 131 households that produced conventional coffee from cluster 2, 103 households increased their endowment of other machinery and tools during the period under observation.[55] The average cash outlay for the machinery and tools was roughly US$331. The average value of acquisitions by organically certified

[54] The most common acquisition was for small tools for the production of coffee and basic grains, such as machetes, shovels, and sorting screens. Another common acquisition was backpack sprayers for the application of liquid fertilizers and herbicides (number of households=19; three of the sprayers were donated by local NGOs and 14 were purchased at an average cost of about US$86). Other, less common, acquisitions included silos for storage of basic grains (4), barrels for storage of basic grains (2), and motorized chain saws (2). The largest cash investment was for US$1,945 for the construction of a hotel and gardens for attracting tourists.

[55] The most common acquisition was for basic tools for production of coffee and basic grains (machetes, shovels, screens). Seventy-two sprayers were acquired at an average cost of US$87. Other common acquisitions included large farm animals (14, at an average cost of US$155) and silos for the storage of basic grains (13, at an average cost of US$100). Two households acquired a used truck, one (for US$7,825) was purchased with credit from a commercial bank and with income from the sale of coffee, while the other (for US$3,922) was purchased with income derived from off-farm employment.

households in cluster 2 was significantly lower at US$193. In most cases, acquisitions were for spray backpacks and small tools. The largest single acquisition was of a motorized chopper for the production of livestock feed, at a cost of US$1,788, acquired through the sale of livestock.

Among the 42 households that produced conventional coffee in cluster 3, 38 increased their endowment of other machinery and tools during the period under observation.[56] The average cash outlay for related acquisitions was roughly US$1,235, which was more than three times the outlay made by conventional producers in cluster 2 and nearly 10 times that made by conventional producers in cluster 1. The average value of acquisitions by organically certified households in cluster 3 was roughly half that of their conventional counterparts, at about US$604.

6.6.3 Addition to and improvement of housing infrastructure

Secure shelter allows households to meet their subsistence needs and to be productive on and off the farm. Typical housing infrastructure for Soppexcca members observed during data collection included a one-room hut with a zinc roof, dirt floor, and in some cases, a latrine (fig. 11). Sampled Soppexcca members reported 1) additions to their housing infrastructure (e.g., construction of a new home, addition of a new room or shop) and 2) changes in the state of their existing household infrastructure (e.g., addition of a solar panel, laying of a concrete floor). Questions related to access to basic services such as electricity, telephone services, and running water were not asked because the vast majority of communities in which the sampled households lived did not have access to such services.

Table 38 presents expenditures for the construction of new houses between 2004–2005 and 2008–2009. Reported expenditures likely underestimate total investments, as timber and other products were likely sourced on the farm and some materials were donated by projects (e.g., zinc roofing, latrines). Such caveats aside, it is surprising the number of households that did not report additions to or improvements in housing during the period. In the case of cluster 1, 83% of the households did not report any investment in housing. The results for clusters 2 and 3 were similar, at 71% and 81%, respectively.

[56] The most common acquisition was for basic tools for the production of coffee and basic grains (machete, shovel, screens). Forty-four backpack sprayers were acquired at an average cost of US$78. Other common acquisitions include silos for the storage of basic grains (19, at an average cost of US$82) and motorized chain saws (15, at an average cost of US$572). Two households acquired a used truck during the period, one (for US$11,179) was purchased with credit from a commercial bank and with income from coffee sales, while the other (for US$3,912) was purchased with income derived mainly from the sale of coffee. Two motorized choppers for the production of livestock feed were acquired at an average cost of US$1,705. One household invested US$7,154 to add expand its house and construct nature trails in an effort to attract tourists. This investment was made possible with prize winnings for coffee cupping contests, a long-term loan from Soppexcca, and earnings from coffee sales. The largest single acquisition was a barn, at a cost of US$2,794, acquired through the sale of coffee.

Fig. 11 Typical housing infrastructure, La Union base cooperative, Jinotega

Among the 61 households producing conventional coffee that invested in new housing, the average expenditure was US$ 2092. As before, expenditures vary considerably according to cluster. Households in cluster 1 had expenditures of about US$2,614; however, the mean is highly influenced by one household that spent more than US$16,000 on a house in the town of Jinotega, with savings accumulated during various years of working in the United States. For this reason, the medium value (US$671) provides a more reliable estimate of central tendency. The mean value of expenditures by conventional coffee-growing households in clusters 2 and 3 is US$1,250 and US$5,596, respectively. Only nine households that produce organically certified coffee had expenditures for new housing during the period. The average expenditure was US$838 across all three clusters.

Table 37. Expenditures for new housing infrastructure, 2004–2005 to 2008–2009

Cluster	# households reporting investments	% of households reporting investments	Total cash investment (US$)	Mean investment (US$) (SD in parentheses)	Median amount (US$)
Conventional households					
1 (n=49)	12	24.5	31,610	2,634 (±4,838)	671
2 (n=129)	41	31.8	51,269	1,251 (±1,561)	838
3 (n=43)	8	18.6	44,774	5,597 (±5,965)	3,969
Total	61	27.6	127,652	2,093 (±3,499)	839
Organically certified households					
1 (n=28)	1	3.6	2,236	2,236 (n.a.)	2,236
2 (n=33)	6	18.2	6,540	1,090 (±1,565)	475
3 (n=10)	2	20.0	2,515	1,258 (±593)	1,258
Total	9	12.7	11,291	1,255 (±1,310)	839

Investments in upgrading key features of existing housing infrastructure during the assessment period were also limited across the clusters (table 39). In 2004–2005, about 60% of the households that produced conventional coffee lived in houses with a dirt floor. By 2008–2009, the percentage had decreased to 55%.[57] Four organically certified households upgraded the floors of their houses during the five-years. All four households attributed the sale of coffee as the major factor that allowed for investment in upgrading.

Most rural households reported having zinc roofs, regardless of income or location. However, a few households reported having roofs made of sheets of black plastic that were tied onto poles made from cut tree branches. In 2004–2005, eight households from clusters 1 and 2 reported having a plastic roof, but by 2008–2009, the number fell to four.[58] These data paint a rough picture of the changes in roofing infrastructure. The age and condition of the zinc are also important determinants of the quality of the roofing. Households were asked if they had invested in the replacement of zinc during the five-year period. Responses indicated that few had done so. Of the 209 households that reported having zinc roofs in 2004–2005, 27 (12.9%) reported having purchased zinc, with an average expenditure of about US$175.

Similarly, there was little variation in the material used for the construction of walls for the houses of the sample. Most had walls made of rough-cut wooden planks. In the worst case, houses had walls made of sheets of black plastic tied to cut tree branches. In the best of cases, walls were made of cement or of a combination of cement of other material, mainly wood. Only five households reported having upgraded their building material from plastic or wood to cement.[59]

[57] One household received a donation of cement that allowed for the upgrade from dirt to cement floor. Another used the proceeds for the sale of property to cover the expense of upgrading. The remaining four households reported that the sale of coffee and other projects had allowed for the upgrading.

[58] One of the households that upgraded the roof was able to do so with support of materials received from other family members. The other three households invested in upgrading with income received from the sale of coffee and other agricultural products.

[59] Three of the households (all conventional producers from cluster 3) were able to provide an estimate of their expenditures, which on average was US$656. One household (conventional from cluster 2) was able to upgrade with donations from other family members and another (organic cluster 1) was able to upgrade with income derived from off-farm employment. Seven households reported have invested in upgrading existing materials, at an average investment of US$452. All these households attributed their ability to investment to the sale of coffee.

Table 38. Improvements in housing infrastructure, 2004–2005 to 2008–2009

Cluster	# households reporting	# households with lower quality material in 2005*	# households with lower quality material in 2009*	# households with improved quality of material
Floor (lower quality=dirt; higher quality=cement, wood, ceramic)				
Conventional households				
1 (n=49)	46	25	24	1
2 (n=129)	125	89	83	6
3 (n=43)	42	14	12	2
Total	213	128	119	9
Organically certified households				
1 (n=28)	25	9	9	0
2 (n=33)	32	21	17	4
3 (n=10)	9	4	4	0
Total	66	34	30	4
Roof (lower quality=plastic tarp; higher quality=zinc panel)				
Conventional households				
1 (n=49)	47	1	1	0
2 (n=129)	125	7	3	4
3 (n=43)	45	0	0	0
Total	217	8	4	4
Organically certified households				
1 (n=28)	26	0	0	0
2 (n=33)	32	0	0	0
3 (n=10)	9	0	0	0
Total	67	0	0	0
Walls (lower quality=plastic tarp, mud or wood; higher quality=cement or combination cement and other material)				
Conventional households				
1 (n=49)	46	25	25	0
2 (n=129)	118	90	85	5
3 (n=43)	38	16	16	0
Total	202	131	126	5
Organically certified households				
1 (n=28)	25	13	13	0
2 (n=33)	28	19	19	0
3 (n=10)	7	4	4	0
Total	60	36	36	0

6.6.4 Summary

Changes in key indicators for physical capital during the assessment period:

- Investments to upgrade wet-milling infrastructure were most common among the sample, with 135 households (105 conventional and 30 organic) investing US$92,465 (US$68,196 in collective investments and US$24,269 in individual household investments). In addition to reducing water contamination and usage, these investments could improve the quality of green coffee.

- Investments in upgrading other equipment and tools for on-farm production totalled US$99,333 during the assessment period. Most of this amount was invested by households producing conventional coffee (US$86,206), with the remaining amount (US$13,127) invested by organically certified households. Among households producing conventional coffee, the average annual investment during the five-year period was US$2,625—or, US$59/year/household. Among organically certified households, the average annual investment during the period was US$2,625—or, US$8.99/year/household.
- Investments in new housing infrastructure totalled US$138,943. Again, most of this amount was invested by households producing conventional coffee (US$127,652), with the remaining amount (US$11,291) invested by organically certified households. Overall investments to improve existing housing infrastructure were limited across the sample.

6.7 Changes in financial capital endowment

This section explores changes in financial capital endowments among sampled households. Discussions begin with an analysis of income levels and sources. Although not an asset per se, income flows are a key determinant of a household's ability to build assets. The diversification of income sources, or lack thereof, provides insight into the vulnerability context faced by the households. Attention turns to access to short- and long-term credit, examining who gets credit, how much is obtained, and from which sources, as well as the ability of households to repay their short- and long-term credit obligations.

6.7.1 Price and income benefits from certified coffee

Fig. 12 compares the prices of parchment coffee received by sampled households between July 2003 and June 2009. Soppexcca prices for members were formulated by averaging the contract price for each type of coffee (less any Soppexcca-related expenses and investments) and subtracting the standard deduction for Soppexcca-provided services, such as processing, marketing, taxes, and certification. During 2008–2009, these deductions were US$22 for conventional coffee and US$24 for organic coffee. Costs of transporting parchment coffee to Soppexcca are paid by the grower. During the 2002–2003 growing year—the last year of the coffee crisis—Soppexcca offered prices that were more than double those offered by direct exporters and local buyers. That said, the Soppexcca prices during that year were far

below the base price for fair trade coffee,[60] reflecting the fact that sales of fair trade coffee made up a relatively small percentage of total coffee sales.

During 2003–2004, however, the gap between prices for conventional coffee offered by Soppexcca and by other buyers closed markedly. All coffee buyers offered increased prices. However, price increases offered by direct exporters and market buyers[61] during that year outpaced those offered by Soppexcca. During the assessment period, prices offered by direct exporters and market buyers peaked briefly above those offered by Soppexcca. This generally occurred during the harvest season (December and March) when competition among buyers was highest. In addition to direct exporters and market buyers, coffee producers also had the option to sell second-quality coffee to market buyers at 50% of the first-quality price. The differentiation in price between first- and second-quality coffee emerged in the 2000s. Prior to the coffee crisis, coffee was generally in mixed quality based on the New York price.

[60] The fair trade price = minimum price of US$125/100 lb + US$ 10/100 lb social premium. However, when the New York coffee price reaches US$125 or more, the fair trade price = New York price + US$10/sack. (Note: the fair trade premium increased by $5/sack on June 1, 2007. New York price = daily closing price of the second position coffee 'C' futures contract at the New York Board of Trade.) For certified organic coffee an extra minimum differential of US$20 per sack is applied. However, the precise amount of direct additional income a producer receives through fair trade is difficult to calculate, primarily because payments vary according to the cooperatives' handling of debt servicing, cooperative expenses, distribution of fair trade social premiums. Secondly, most cooperatives cannot sell all their members' coffee through fair trade channels and so sell the remainder at regular prices. But payments to producers for sales of fair trade and non-fair trade coffee are often pooled into a single payment.

[61] Prices set by direct exporters are 20% to 30% of the New York contract "C" price for coffee (with variation depending on demand for coffee by processors). The margin covers costs faced by exporters in the processing and marketing of coffee. Data for New York prices were obtained from the International Coffee Organization. Market buyers purchase parchment coffee under contract with direct coffee exporters. Price offered by market buyers is the direct exporter price, minus a commission, which varied at the time between US$0.57 and US$2.78 (per 100-lb bag of parchment coffee). Commissions were reported by sampled market buyers in Jinotega and Matagalpa for the 2008–2009 production year.

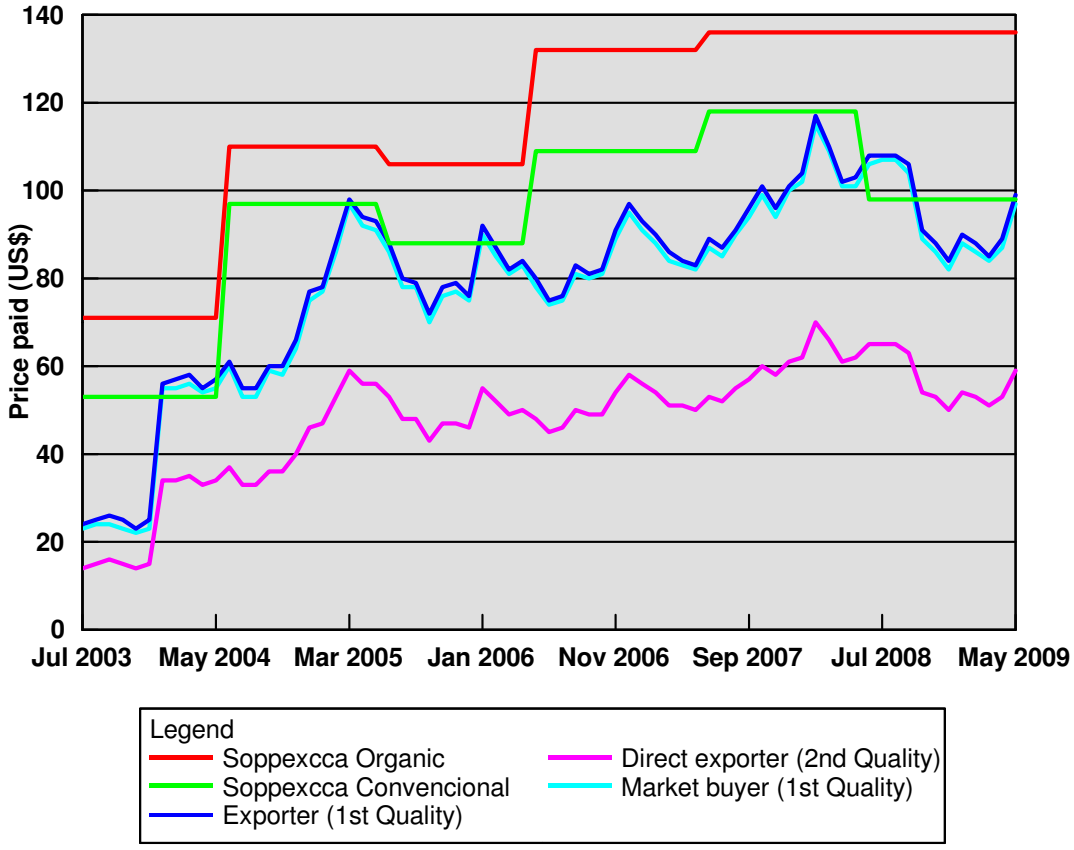

Fig. 12 Prices paid for parchment coffee in Nicaragua, July 2003–May 2009

Table 40 estimates the difference in farm-gate prices for parchment coffee between those offered by Soppexcca and those offered by other local buyers. For organically certified coffee producers, selling organically certified coffee to Soppexcca provided prices between US$35/100 lbs and US$55/100 lbs higher than selling to local buyers. An outlier was 2008–2009, when differential reached roughly US$63/100 lbs In general, the data suggested that price differentials for organic coffee had increased in recent years. According to interviews with Soppexcca staff, this reflected high demand for organically certified and fair trade certified coffee, as well as a limited supply response. For producers of conventional coffee, the price differential received from the sale of coffee to Soppexcca fluctuated between 20% and 30% over the price offered by other local buyers. That said, there are higher costs related to the sale of coffee to Soppexcca, as compared to direct buyers or other buyers, including 1) especially high quality standards and 2) delayed final payment (about 20% of total payment) until after all coffee contacts have been paid by Soppexcca buyers (between May and June). For some coffee producers, these additional costs reduce or eliminate the potential price benefits from the sale of conventional coffee to Soppexcca.

Table 39. Estimated price benefit from sale of parchment coffee to Soppexcca (as compared to direct exporters), 2003–2004 to 2008–2009

Production year	Reference price (US$/100 lbs)		Producer price (US) (US$/100 lbs)		Price (US$) benefit from selling to Soppexcca	% higher price from selling to Soppexcca
	Non-certified*	Fair trade certified	Direct exporter**	Soppexcca		
Organically certified						
2003–2004	NA	140.00	NA	85.00	36.23	73.5
2004–2005	NA	140.00	NA	124.00	38.70	45.9
2005–2006	NA	140.00	NA	120.00	35.76	42.9
2006–2007	NA	140.00	NA	146.00	54.72	60.4
2007–2008	NA	150.00	NA	150.00	41.97	38.9
2008–2009	NA	155.00	NA	150.00	63.30	72.4
Conventional						
2003–2004	65.03	125.00	48.77	65.00	16.23	32.7
2004–2005	114.73	125.00	85.30	109.00	24.70	28.2
2005–2006	112.32	125.00	84.24	100.00	16.76	19.0
2006–2007	122.71	126.71	91.28	121.00	30.72	33.0
2007–2008	144.05	154.05	108.03	130.00	21.97	20.4
2008–2009	116.61	135.00	86.70	110.00	23.30	26.4

* Four-month average of New York “C” contract price between December and March
** Price is calculated at 75% of the four-month average of the New York price.

Previously, it was observed that most Soppexcca-affiliated households sell a significant percentage of their annual coffee production to buyers other than Soppexcca. Table 41 presents estimates of the annual gross income benefits sampled households received by selling coffee to Soppexcca and other buyers (thus taking into account side selling). Among households in cluster 1, organically certified households earned an estimated US$164, roughly seven times the earnings of their conventional counterparts. Among households in cluster 2, additional earnings were only marginally higher, for producers of conventional and organically certified coffee, at US$72 and US$252, respectively. Organically certified households from cluster 3 achieved the highest additional income (US$1,356), followed by conventional households from the same cluster (US$341).

Table 41 also provides insights into the cost of side selling to the sampled households in terms of reduced gross income from coffee between 2006–2007 and 2007–2008. Across all organically certified producers, on average, households captured 67% of the highest possible income benefit from sales to Soppexcca. Households in cluster 3 captured 71%, followed by households in cluster 2 with 69%, and households in cluster 1 with 64%. The ability to capture fully the income benefits from participation in certified coffee markets was markedly lower, however, for households producing conventional coffee. Among all conventional producers, on average, 36% of the income benefits were captured. Households in cluster 3

struggled the most, with 32% of total benefits captured, followed by households in cluster 1 (33%) and cluster 2 (38%).

Table 40. Estimated average annual gross income benefit (US$) for households from coffee sales to Soppexcca and other buyers (2007–2008 to 2008–2009)

Cluster	Total coffee production (100 lb. green coffee)	Highest *possible* income from coffee*	Highest *possible* income benefit**	*Actual* income from coffee taking into account sales to Soppexcca and other buyers	*Actual* additional income from coffee sales from sales to Soppexcca	Percent of total highest possible income captured
Conventional						
1	5.9	635	63	347	21	33
2	18.0	1,940	191	1,154	72	38
3	100.2	10,822	1,064	5,791	341	32
Total	31.3	3,379	333	1,933	119	36
Organic						
1	6.6	902	256	631	164	64
2	9.5	1,296	368	966	252	69
3	49.4	6,719	1,909	5,171	1,356	71
Total	14.0	1,905	541	1,392	363	67

* Assumes that 100% of coffee production was sold to Soppexcca. The following two-year average farm-gate prices were used: US$ 136 for organic coffee and US$ 114 for conventional coffee.

** Difference in income generated from 100 percent of coffee production being sold to Soppexcca versus income generated from 100 percent of coffee being sold to other buyers. A two-year average farm-gate price of US$ 97 was used for estimating income from sales to other buyers.

6.7.2 Diversification of short-term credit sources

As highlighted previously, most sampled households (57%) did not report access to short-term credit prior to joining Soppexcca. However, since 2005, opportunities for obtaining short-term credit increased, as prices in international coffee markets increased significantly and have remained at relatively high levels. In addition to Soppexcca, other sources for short-term credit for agricultural production identified by the sampled households were 1) commercial banks and specialized lending organizations, 2) coffee buyers, such as direct exporters and intermediaries, 3) NGOs and projects, and 4) informal lenders (individual persons).

Collateral requirements varied among the different types—for example, formal lenders and direct exporters required land titles for credit access while Soppexcca, intermediaries, specialized lending organizations, NGOs, projects, and informal lenders typically did not. The cost of short-term credit provided by Soppexcca (16% annual interest) was markedly less in 2008–2009 than credit provide by other sources. The average annual interest charged by all other sources was 21.3%. The cost of short-term credit by other sources showed relatively limited variation: El Fondo de Desarrollo Local (FDL), a specialized lender for agricultural production,

charged an average of 23.5%; Osman Gutierrez charged an average of 22.2%; the commercial bank Citibank charged 19.6%; while the NGO Casa del Niño charged an average of 18.6%. However, annual interest rates that significantly exceed these average rates were reported: market buyers charged 50% to 60% annual interest and one informal lender changed 120%. On the other hand, these lenders typically provided credit in the form of basic grain and other basic foodstuffs throughout the year in exchange for promises to deliver coffee during the harvest season.

Forty-four households from clusters 1 and 2 (or 15% of the sample) reported no use of short-term credit between 2004–2005 and 2008–2009. Among the 248 households that received short-term credit, most (n=160, 55%) reported Soppexcca as their only source of short-term credit. However, households were able to obtain credit from Soppexcca and other sources in some cases. For households in clusters 1 and 2, additional credit was often sought for the production of basic grains. In the case of cluster 3, households often sought additional credit for coffee production. Sixty-seven households reported credit sources in addition to Soppexcca (table 42). The mean amount of the most recent additional credit obtained varied markedly by cluster: from a low of US$225 for households in cluster 1 to a high of US$2,352 for households in cluster 3.

Soppexcca provided credit that covered only the most basic of coffee production activities. The amount provided was based on an assessment by a Soppexcca extensionist, with little input from the producer. A four-year credit history from Soppexcca was available for the 174 households that received credit from the four-year period between 2004–2005 and 2007–2008. (Credit history for the 2008–2009 production year was not available at the time of data collection.) The cluster make-up of this subset of the sampled households was as follows: 43 from cluster 1, 97 from cluster 2, 34 from cluster 3. Table 43 compares the average amount of credit received by these households across the three clusters between 2004–2005 and 2007–2008. The differences between the mean credit values were statistically significant across all four of the years under observation. The mean credit values for households in cluster 1 ranged from a high of US$197 in 2007–2008 to a low of US$110 in 2006–2007. With the exception of the year 2005–2006, the mean credit values for households in cluster 2 were roughly twice the mean credit values of households in cluster 1. Households in cluster 3 received markedly greater credit volumes that those of clusters 2 and 3.

Table 41. Access to short-term credit from sources other than Soppexcca

Cluster	# household	Source				Mean amount of credit
		Bank/	Intermediary	NGO	Informal	

	reporting access to credit	specialized lending organization	/exporter	/project	lender	(US$)*
Households with credit in addition to Soppexcca-provided credit						
1	12	3	1	7	1	225
2	39	9	14	14	2	467
3	16	6	6	1	3	2,353
Households with credit only from sources other than Soppexcca						
1	2	0	0	2	0	130
2	11	4	3	4	0	514
3	8	4	3	0	1	1,140

* Credit amount reported to last credit received from reported source

Between 60% and 74% of the 174 households received credit in any one year (table 43). Among the 43 households in cluster 1 that received credit during the period between 2004–2005 and 2007–2008, only four households received credit in each of the four years. Nine households received credit in three of the four years, 10 households received credit during two of the four years, and 20 households received credit in only one of the four years. Among the 97 households from cluster 2 that received credit from Soppexcca during the four-year period, 11 households received credit in each of the four years. Twenty-eight households received credit in three of the four years, 19 households received credit during two of the four years, and the remaining 39 households received credit only once during the four years. Among the 34 households from cluster 3 that received credit from Soppexcca during the four-year period, seven households received credit in each of the four years. Five households received credit in three of the four years, six households received credit during two of the four years, and the remaining 16 households received credit only once during the four years.

Table 42. ANOVA comparing short-term credit provided by Soppexcca, from 2004–2005 to 2007–2008, by cluster

Production year	Cluster	# house-holds receiving credit	Mean credit amount (SD) (US$)	Standard error	95% confidence internal around the mean	
					Lower limit	Upper limit
2004–2005 F (2, 88)=15.17 p<.05	1	20	132.63 (±79.43)	19.86	90.30	174.95
	2	61	240.84 (±159.48)	21.31	198.13	283.54
	3	24	480.39 (±312.31)	78.08	313.97	646.80
	Total	105	264.72 (±214.74)	22.89	219.22	310.21
2005–2006 F (2, 106)=26.29, p<.05	1	29	231.48 (±218.54)	41.30	146.74	316.22
	2	74	282.60 (±209.36)	27.03	228.51	336.68
	3	26	1,111.19 (±1003.39)	236.50	612.22	1,610.16
	Total	129	409.80 (±549.52)	53.37	303.97	515.63
2006–2007 F (2, 67)=11.65, p<.05	1	24	110.59 (±130.76)	32.69	40.91	180.27
	2	58	193.62 (±199.11)	32.30	128.18	259.07
	3	24	562.50 (±495.45)	137.41	263.10	861.90
	Total	106	245.37 (±310.64)	37.95	169.60	321.14
2007–2008 F (2, 104)=46.58, p<.05	1	33	197.12 (±188.40)	34.98	125.45	268.78
	2	64	390.26 (±320.4)	44.01	301.93	478.59
	3	27	1,805.03 (±1305.53)	278.34	1,226.19	2,383.87
	Total	124	635.68 (±886.68)	86.94	463.24	808.12

Source: Soppexcca credit department

As evidenced above, most households did not receive credit during each of the years under analysis. This raises the possibility that households were unwilling or unable to receive additional credit. Table 44 presents data of household's ability to repay short-term credit for the four years between 2004–2005 and 2007–2008. Among households in cluster 1, the percentage of households unable to repay their short-term credit obligations to Soppexcca fluctuated between 20% (2004–2005) and 55% (2005–2006). In the 2005–2006 year, six households had a debt of more than US$100 to Soppexcca. Each US$50 of debt roughly translates into an additional bag of parchment coffee that has to be delivered to Soppexcca without pay during the following production year. Given that, on average, a household in cluster 1 only produces 8.8 bags per year, even a small amount of debt can mean limited or no access to credit during the following year. In the case of cluster 2 households, the results are only slightly more encouraging, with the percentage of households unable to meet short-term credit obligations ranging from 17% (2007–2008) to 38% (2004–2005). This analysis highlights the double-edged sword that credit provision represented for those households with relatively limited land available for coffee production and that had yet to achieve reasonable productivity levels that would allow increased ability to repay credit obligations.

Table 43. Household ability to repay short-term credit for coffee production provided by Soppexcca to household producers, 2004–2005 to 2007–2008

	End-of-the-year short-term credit balance (US$)*				
	-101 and less	-100 to -51	-50 to -1	0-50	51 and over
Cluster 1					
2004–2005	1	1	2	4	12
2005–2006	6	9	1	2	11
2006–2007	1	1	4	4	14
2007–2008	4	4	7	2	16
Cluster 2					
2004–2005	8	9	6	4	34
2005–2006	11	2	0	5	56
2006–2007	3	3	7	7	38
2007-2008	5	2	4	4	49
Cluster 3					
2004–2005	1	1	0	1	21
2005–2006	0	0	0	0	26
2006–2007	3	0	0	1	20
2007–2008	4	1	0	1	21

Source: Soppexcca credit department

* Obtained by subtracting short-term annual credit obligations and advance payments for coffee deliveries from total income obtained from coffee sold to Soppexcca. The amount of advance payment varies between 2004-2005 and 2007–2008 (based on international coffee prices), from a low of US$0.10/lb (parchment) to a high of US$0.20/lb (parchment).

6.7.3 Diversification of long-term credit sources

As discussed previously, the ability households from clusters 1 and 2 to expand coffee production was related to their access to long-term credit. Credit was also used by the sampled households for investments to improve wet-milling operations and purchase livestock. Soppexcca was the most important source of long-term credit for the sampled households (table 45). Analysis here focuses on understanding which sampled households received long-term credit (and how much was received and from which sources), as well as the ability of the sampled households to repay the credit provided by Soppexcca.

Between 2004–2005 and 2008–2009, 25 sampled households received US$70,011 in credit for the purchase of land. The average amount of credit was US$2,756. Roughly 85% of this credit was provided by Soppexcca. Among the clusters, the average amount varied from a low of US$1,584 for households in cluster 1 to a high of nearly US$3,000 for households in cluster 3. However, the difference in the mean values across the clusters was not statistically significant. For households in clusters 1 and 3, Soppexcca supplied nearly all of the credit for land expansion. Among households in cluster 2, a total of US$40,162 in credit was received, of which

roughly 77% was provided by Soppexcca. The remaining 23% of the credit was provided by other coffee buyers (e.g., Osman Gutierrez) and commercial banks.

Table 44. ANOVA comparing long-term credit from 2004–2005 to 2008–2009

Credit use	Cluster	N	Total credit reported (US$)	% credit provided by Soppexcca	Mean credit amount (SD)	Standard error	95% confidence internal for mean	
							Lower limit	Upper limit
Purchase of land F (2, 22)=.047 p>.05	1	3	4,751	100.0	1,584 (703)	406	-163	3,331
	2	14	40,162	76.5	2,869 (2,400)	641	1,483	4,254
	3	8	25,097	95.5	2,998 (2235)	790	1,129	4,866
	Total	25	70,011	84.9	2,756 (2194)	439	1,850	3,661
Renovating existing coffee plantations or establishing new plantations F (2, 136)=16.10 p<.05	1	25	22,057	100.0	882 (1,141)	228	411	1,353
	2	91	75,927	94.6	832 (574)	60	712	951
	3	23	62,068	99.0	2,699 (3152)	657	1,335	4,061
	Total	139	160,064	96.9	1,150 (1583)	134	884	1,415
Other needs (purchase of wet-milling infrastructure, purchase of livestock, etc.) F (2, 42)=3.34 p<.05	1	7	3,321	66.1	475 (250)	94	243	705
	2	22	31,226	66.9	1,556 (2,041)	448	623	2,489
	3	16	63,301	57.2	3,769 (4,776)	1,194	1,224	6,313
	Total	45	97,847	61.3	2,174 (3,387)	504	1,157	3,192

For many households, credit for expansion and improvement of coffee plantations provided capital for rebuilding natural capital after a prolonged period of erosion during the coffee crisis. The average amount of credit across the sample for the five-year period was US$1,150.[62] The average amount varied by cluster: from a low of US$882 for households in cluster 1 to a high of US$2,699. Soppexcca was the

[62] Setting up a new area of coffee production requires significant investment. In addition to the direct costs (years one to three) of establishment (land clearing, planting, establishing and maintaining the coffee until fruit bearing), households must bear the opportunity costs of approximately three years without income until the plants begin to produce. The standard amount that Soppexcca lends to its members to establish a manzana of coffee is $1,200 (2009). Rodríguez and Vásquez (2004) estimate set up costs for smallholder coffee production at $1,203, of which US$ 1,040 is for setup and US$164 is for maintenance during the first year. These figures include expenses for chemical inputs and labour. However, not all of the increase in coffee area by Soppexcca members is new production (increase could be the rejuvenation of previously unproductive coffee). Many households affiliated with Soppexcca do not use any chemical inputs and the hiring of labour is reduced to a minimum. This implies that the overall costs of expansion of coffee production may be much lower in some cases.

major source of credit for expansion and rejuvenation of coffee plantations, providing nearly 97% of the total credit obtained. In only a few cases were commercial banks and specialized finance organizations able to provide long-term credit for improving coffee plantations.

By providing long-term credit, Soppexcca, commercial banks, and other coffee buyers facilitated the expansion of infrastructure, machinery, and tools, as well as livestock and other types of investments for agricultural production among the sampled households. Forty-three sampled households received long-term credit for the abovementioned purposes. These households reported US$97,847 in credit received between 2004–2005 and 2008–2009. Soppexcca accounted for 61% of the total credit reported by the sampled households. With the reduced involvement of Soppexcca, the difference between the mean credit amounts per cluster increase markedly. The majority (64%) of the long-term credit was provided to 16 households in cluster 3. The mean credit received by households in cluster 3 was US$3,769. Households in cluster 2 received approximately 32% of the total credit amount. The average size of the credit was US$1,556, or approximately 41% of the mean amount received by households in cluster 3. Households belonging to cluster 1 received on average US$475 of the long-term credit for expansion and maintenance of physical capital and other agricultural-related investments. The average amount of credit received by households in cluster 1 was a mere 13% of the average amount received by households in cluster 3.Table 46 sheds additional light on the difficulty faced by households to comply with long-term credit obligations to Soppexcca. Credit repayment was assessed over the period between 2004–2005 and 2007–2008 for 72 households. Compliance was lowest for households in cluster 1, where only two of the sampled households had sufficient coffee production to meet their long-term credit obligations for the given year. Among households in cluster 2, during years of relatively low production, such as 2004–2005 and 2006–2007, few households were able to comply (in the extreme case of 2004–2005, none of the households complied). In years of higher production, such as 2005–2006 and 2007–2008, between 39% and 36%, respectively, of the sampled households were able to comply fully with their long-term credit obligations. Results for cluster 3 also appeared to fluctuate according to production volumes, with 22% of households fully complying with credit obligations in period of low production volumes (2004–2005 and 2006–2007), and 60% to 67% in periods of relatively high production levels (2005–2006 and 2007–2008).

Table 45. Percentage compliance with long-term credit obligations with Soppexcca from 2004–2005 to 2007–2008

	Percentage compliance with long-term credit obligations*				
	0%–24%	25%–49%	50%–74%	75%–99%	100%+
Cluster 1					
2004–2005	5	0	0	0	0
2005–2006	7	1	3	1	0
2006–2007	3	0	0	0	0
2007–2008	3	0	0	1	2
Cluster 2					
2004–2005	10	0	0	0	0
2005–2006	7	3	2	2	9
2006–2007	10	6	2	0	2
2007–2008	9	1	2	2	8
Cluster 3					
2004–2005	5	2	0	0	2
2005–2006	2	1	3	0	9
2006–2007	5	0	2	1	2
2007–2008	2	0	0	1	6

Source: Soppexcca credit department

* Percentage compliance calculation = (total coffee delivery—short-term credit obligations)/long-term credit obligations, negative percentage compliance reported as zero

6.7.4 Summary

Changes in key indicators for financial capital during the assessment period:

- The price benefits received from participation in value chains for certified fair trade coffee were diluted due to 1) high costs of operations by Soppexcca (and their need to repay debt and capitalize) and 2) need by households to sell a significant percentage of their annual production to buyers other than Soppexcca. Any solution to this problem will likely require sustained investments by the public sector to build assets at the household level to expand and smooth income generation and increase resilience.
- Soppexcca was the main provider of short-term credit to households in clusters 1 and 2. Few organizations, including not-for-profit lenders, were able to assume the risks related to offering credit to asset-poor coffee households. Soppexcca was the only provider of long-term credit.
- Soppexcca's members faced major challenges in complying with short- and long-term credit obligations in any one year due to fluctuations in coffee production and need to sell coffee to buyers other than Soppexcca. Debt repayment depends heavily on a good harvest. Overall commitment to repaying Soppexcca-provided credit was high by most households (given that future credit depends on their ability to repay outstanding debt).

7 Lessons from the Soppexcca case study

7.1 Introduction

This chapter discusses lessons from the Soppexcca case study (chapters 5 and 6) in the context of the literature on poverty reduction and private-sector development. The following section discusses asset building by Soppexcca and other rural community enterprises and the related impact on relationships with buyers and members. The third section discusses asset building by the rural poor at the household level and the related implications for improved welfare and strengthened resilience. The final section presents a critical reflection on the application of the conceptual and methodological framework and related implications for development practice.

7.2 Asset building by Soppexcca

The initial stage of Soppexcca's development presents a near worst-case scenario for cooperative development in a competitive international market. In its first two years, Soppexcca inherited a considerable debt from its predecessor organization and faced down Hurricane Mitch. Between 2000 and 2003, the coffee crisis meant that producers struggled to deliver their coffee to Soppexcca. While fair trade and other markets for certified coffee offered higher prices, only a relatively small percentage of Soppexcca coffee entered fair trade markets during the years of the coffee crisis. Production of certified organic coffee had not yet begun. Despite the formidable odds, however, Soppexcca achieved major additions to its asset base during the assessment period, but that increase in assets did not come cheaply for Soppexcca, its NGO partners, or its members. The literature has yet to provide sufficient insights into which options would most effectively build RCEs in less time and at less expense, given the generally inhospitable business environment in which RCEs operate and the realities of government, donor, and NGO support.

7.2.1 Lessons in human capital development

Preexisting levels of human capital at Soppexcca were high but were concentrated in a few key staff. A dedicated professional general manager and some key extensionists held the organization together prior to and during the assessment period. In his review of cooperatives in Asia and Africa, Harper (1992, 142) observed that relatively successful cooperatives included "an unusual person in that she or he possessed entrepreneurial characteristics and management skills of a high level." Harper's findings certainly hold true for the Soppexcca case. Only in isolated

instances did interviewed Soppexcca members mention difficulties or concerns with lower-level administrative staff.

The central issue related to human capital concerned the sustainability of an effective administration. In the context of this research, key informants expressed concern that the general manager will soon leave Soppexcca and that buyer relations would suffer as a result. The centralized governance structure in place prior to and during the assessment period provided stability and inspired trust with members, NGOs, and buyers. Soppexcca has struggled to build a more active and informed member participation in its governance. As noted by Utting (2008), Soppexcca's efforts to build human capital must overcome high levels of illiteracy in most of its members, low education levels of representatives on the board, and an overall lack of knowledge about how to manage legal, commercial, organizational, and certification requirements. However, the viability of Soppexcca and its credibility as a producer-owned enterprise may depend on increasing human capital among members for cooperative strategic decision making and oversight. The literature has yet to address the potential for collaboration between RCEs, service providers, and research centres to build more effective and sustainable bottom-up governance structures. Also, literature discussions of cooperative administration have yet to go beyond the potential for elite benefit capturing by volunteer or professional leaders. Evidence here suggests that more in-depth discussions are needed, taking into account issues of culture, information sharing, and the role of NGOs in building and supporting the development of effective governance structures.

The dramatic increase in the number of extensionists featured prominently among the changes in human capital. However, to what extent has this change improved Soppexcca's capacities to promote improved skills among its members? In countries such as Nicaragua, where government-provided extension services for coffee are in short supply, RCEs can play an important role in upgrading producers' skills. Discussions in the literature provide little recognition that cooperatives struggle to build their own capacity to provide effective technical assistance to its membership base. This may be because discussions have generally focused on RCE development in Africa, where the political-legal environment for cooperative development is markedly different from that of Latin America. Soppexcca faced several challenges to build the capacities of its extension staff: 1) culture and mindsets (extensionists with willingness or incentives to identify problems of poor farmers and respond with tailored approaches), 2) unstable contract periods and high turnover (contracts dependent on NGO support), and 3) limited ability to upgrade and apply their skills (need to carry out tasks in addition to extension). Another problem

was a lack of useful information. For example, evidence suggested that technical staff learned the best options for organic fertilization through trial and error during the first years of production. At the time of assessment, no program existed for assessing and monitoring the performance of Soppexcca's extension staff. In addition to upgrading the RCE skills for administration and marketing—a task often identified in the literature (e.g., Collion and Rondot 2001)—there is a need for deeper thinking about why RCE-provided technical services may not have the desired impact and what can be done to make their services more effective.

7.2.2 Lessons in social capital development

Soppexcca enjoyed especially high levels of preexisting social capital as compared to most cooperatives. The strong bonds between Soppexcca and its European buyers and many of its early members are a direct result of Soppexcca's ability to organize itself after the embezzlement of funds by the manager of its predecessor cooperative. Various authors have identified the catalysing role of failure and crisis in building social capital in cooperatives (Harper 1992; Chirwa et al. 2005).

During the assessment period, bridging capital expanded to include new relations with coffee buyers in the United States, while relations with existing European coffee buyers remained strong. Interviewed buyers considered Soppexcca to be among their most trusted (if not the most trusted) supplier of specialty coffee. Interviews also revealed high levels of shared beliefs and attitudes in fairness, quality, and transparency in business relations. Trust was reinforced by Soppexcca's ability to comply with volume commitments (and effectively communicate when problems emerged that might jeopardize their ability to comply) and supply coffee that consistently met or exceeded buyer expectations.

However, Soppexcca's social capital with its buyers may have come at the expense of increased benefits for its members. A commitment by Soppexcca to deliver high quality coffee to buyers implied higher production costs for members during a period of intense local competition for coffee. Recognizing that during most of the assessment period local markets offered farm-gate prices at or near those offered by Soppexcca and that their quality requirements were generally lower, a strong motivation existed for members to sell coffee outside of Soppexcca. Soppexcca grower prices during much of the assessment period were depressed due to the need to repay the debt to the European buyers.

If costs were higher, and the price incentive was reduced, then why did households deliver their coffee to Soppexcca? For many of the better-off households, interviews pointed to access to credit as the primary motivation. For others, including

the most asset poor, it was assistance with land tenure problems, social support, and insurance against major negative price fluctuations in coffee. This suggests that the glue that bonds Soppexcca to its members is Soppexcca's provision of services other than the marketing services that form the core of its mission—at least for the poorer members. Membership in Soppexcca rested on their access to services that provided opportunities for building assets and increasing resilience to shocks—services supported in large part by NGOs. Soppexcca delivered services in high demand by households and of very limited supply (e.g., short- and long-term credit, assistance with land tenure, technical assistance, and a form of insurance for changes in coffee prices through fair trade certification). These findings are in line with observations by Ruben and Lerman (2005, 44), who argued that cooperative membership in Nicaragua has more to do with noneconomic factors, including uncertainties regarding land ownership and outstanding debts and better access to services.

The weakest component of Soppexcca's social capital endowment related to the limited progress in democratizing decision making and planning processes. Formal member participation in Soppexcca's governance (e.g., organization of the board of directors and other groups) began during the assessment period, following the reorganization of Soppexcca from a privately owned enterprise to a cooperative. Members lacked the capacity to fill these roles in an effective manner for various reasons, including lack of information and limited ability to oversee operations. According to one board member, board members felt attempts to question Soppexcca's management and the performance of the board were disrespectful to senior management. There can be little doubt that Soppexcca would benefit from a stronger and more effective board with more effective member participation, providing increased stability and legitimacy over the long term. However, addressing this issue will require a strong commitment among managers and members to improve the quality and timeliness of information flows and capacity building among a critical mass of members to facilitate their ability to provide guidance and oversight for cooperative management.

Soppexcca made little progress in strengthening the capacities of base cooperatives to coordinate the delivery or transport of coffee or to facilitate the provision of services (e.g., credit delivery, technical assistance). Throughout the assessment period, base cooperatives had little if any direct role in Soppexcca's operations (beyond that of providing elected leaders to serve on the boards of directors and similar groups). Given the geographical dispersion of Soppexcca's base cooperatives and the difficulty in coordinating actions, development of the base cooperatives could provide potential solutions for addressing some of the most

vexing problems identified by members (e.g., dependence on public transport for delivery of coffee, need to travel to Soppexcca for all payments, limited access to technical assistance).

To what extent has Soppexcca positively influenced social capital at the territorial level? The results were mixed. Prior to the assessment period, Soppexcca opened its membership to base cooperatives and unorganized communities with both high and low average levels of asset endowments. In some cases, asset endowments were especially low, with major investments needed to upgrade their productive capacities (e.g., Julio Hernandez, El Esfuerzo). During the assessment period, Soppexcca increased its base cooperative membership by only one base cooperative (Los Alpes). Moreover, no plans exist to expand the membership base beyond the approximately 500 members currently enrolled because of the limited size of the short-term credit portfolio and the reluctance to reduce the average amount of credit across the membership base. Thus, the ability of Soppexcca to increase its membership base will depend on its ability to increase its human and financial capitals. In this sense, it remains unclear how far Soppexcca's activities foster a more broadly based territorial development in Jinotega. These finding support those by Bebbington, Quisbert, and Trujillos (1996), who described the reluctance of the cocoa cooperative El Ceibo in Bolivia to reduce its membership fees (given its repaid accumulation of physical capital, most of which was subsidized with donor funds) and allow for more broad-based participation.

7.2.3 Lessons in physical capital development

Soppexcca's endowments of physical capital increased significantly during the assessment period. NGO-backed projects financed most of the direct costs for these investments, the exception being the dry-processing plant, which was financed with a combination of its own funds, grants, and loans. At the time of data collection for this study, the fertilizer production facility had yet to function due to uncertainties about the interpretation of organic standards on the use of chicken-manure fertilizer. The 11 offices for base cooperatives provided a meeting space for training and other events, as well as lodging facilities for Soppexcca extension staff. Given the limited role of base cooperatives in the production and transport of coffee, however, these offices appear underutilized. The dry-processing plant allowed Soppexcca greater control over the processing of its coffee (rather than depending on third-party processors). It also provided a potential long-term option for generating income. Currently however, the plant requires major additional investments in upgrading and expanding

equipment and in achieving full operating capacity, thus casting doubt on the income-generating potential in the midterm.

The physical capital endowment at the end of the assessment period approached that of other large coffee cooperatives in Latin America that had enjoyed strong NGO support prior to and during the coffee crisis. For example, Prodecoop, a second-tier cooperative in Las Segovias, Nicaragua, increased its assets from US$1.2 million in 2001 to $1.8 million in 2005, in addition to increasing its overall capacity for business administration and coffee processing (Valkila and Nygren 2008). The importance of physical capital for long-term cooperative development is recognized by the literature. Bebbington, Quisbert, and Trujillo (1996) identified major investments in chocolate processing as a major factor in the success of El Ceibo cocoa cooperative in delivering economic benefits to its members. In their review, Donovan, Stoian, and Poole (2008) argued that processing infrastructure was a key factor in determining the economic viability of RCEs in Latin America. However, they also cautioned that RCEs typically operated processing infrastructure at less than full capacity and owned second-hand equipment, which lowered initial investment but resulted in higher maintenance and operating costs over time. This appears to be the case with Soppexcca in its purchase of the dry-processing plant for coffee.

From Soppexcca's point of view, the investments in physical capital were critical to 1) increase its long-term ability to generate income from sources other than the sale of green coffee and 2) reduce its dependence on NGO support for covering basic operations. However, the current debt (and future liabilities) assumed by Soppexcca in purchasing the dry-processing plant leads to questions about the related opportunity costs. Repaying the debt will reduce Soppexcca's ability to offer higher prices to its members and to invest in other assets that could provide a more direct impact on members' asset base in the short-term to midterm (e.g., targeted credit services, innovations in technical assistance). As long as Soppexcca struggles to compete with prices offered by local traders, there is limited opportunity for Soppexcca to increase its payments and services to its growers that would reduce side selling and increase its capture of raw material.

In general, Soppexcca's investing considerable sums in the purchase and upgrading of the dry-processing plant, at the expense of other investment needs, reflects the difficulty of operating in a competitive market and limited government support for developing value chains for certified coffee. Ideally, any one cooperative would have alternatives to the purchase of the dry mill, in the form of a competitive local processing sector for certified coffee. Similar considerations have been observed elsewhere: in answering the question why the cashew sector in

Mozambique was unable to compete internationally in the processing of cashews (and thus forced to export unprocessed nuts), Cramer (1999) argued that the problems faced by the Mozambique industry were more political in nature than technical or related to relations along a value chain. The development of the cashew sector would require that the Mozambique government and others abandon the idea of competing based on a level playing field and accept the need for a clear vision for sectorwide development, capacity and willingness to enforce standards, and mechanisms for mediating relations between firms.

7.2.4 Lessons in financial capital development

Various researchers have acknowledged the challenges faced by RCEs in generating and sustaining the income flows that would allow for cost recovery and significant levels of investments and savings (Tendler 1983; Berdegué 2001; Anderson and Henehan 2003). The findings suggest that participation in fair trade markets allowed for significant investments but was not enough to cover all expenses. During the assessment period, Soppexcca paid off its debt with its coffee buyers and built its credit program; however, technical assistance and long-term credit depended entirely on external support and no retained earnings were reported during the assessment period.

The market context hindered, in part, Soppexcca's ability to build financial capital. Prior to the assessment period, when prices for fair trade certified coffee received a significant price premium over locally sourced noncertified coffee, Soppexcca's sales of fair trade coffee represented a small percentage of its total sales. During the assessment period, sales of fair trade coffee grew rapidly, but the price premium received by Soppexcca for its fair trade coffee (relative to prices paid by local traders) was considerably smaller. The use of the social premium from fair trade sales provided much-needed funds for paying down the debt and making strategic investment (at the expense of increased income or community development projects for members). Subsidies from donors and NGOs filled in the remaining gaps, one of which was the cost of technical assistance. This also meant that NGO and donors played a major role in determining the objectives and priorities of technical assistance, which may or may not have been in line with the interests of Soppexcca members.

Donor subsidies played a critical role in building Soppexcca's credit program. During the assessment period, Soppexcca made major advances in accumulation of funds for offering short-term credit. Contributions to the portfolio flowed directly from grants and from the repayment of long-term credit (also subsidized with donor funds).

Soppexcca was the only coffee cooperative to provide long-term credit to members among the five cooperatives interviewed for this research. Among microfinance institutions, scarce amounts of long-term credit flowed to smallholder coffee producers. Funding for Soppexcca's long-term credit program stemmed from strong relations with a few key NGOs. While Soppexcca was willing to offer long-term credit with donor funds, it was not willing to recycle the repayment of long-term loans into the long-term credit portfolio. The risks were too high and the need to use short-term credit for securing access to raw material was too great. As noted in the household-level analysis, long-term credit played a critical role in building assets at the household level. For most households, their strong bonds with Soppexcca meant that the risk they faced in taking credit with Soppexcca was relatively low, and thus, Soppexcca was able to provide credit to households that would most likely have not taken credit from other sources.

The offer of a credit program by Soppexcca was, however, a double-edged sword. On one hand, without short-term credit, Soppexcca would have little hope of competing with local traders, and long-term credit is among the most valued services that Soppexcca provides to its members. On the other hand, evidence from household interviews made clear that short-term credit from Soppexcca was not always used for coffee production (a situation also observed by Valkila [2009] among Nicaraguan coffee cooperatives, delinquency rates for any given year were high and administration of the credit program consumed significant staff time and resources. In 2008, Soppexcca took a major positive step to improve the performance of its credit program by offering the direct purchase of fertilizer with credit funds. Household interviews detected a significant increase in fertilizer usage following the implementation of this policy. The ability of Soppexcca to make further gains in reducing delinquency and increasing access to raw material will likely hinge on its ability to redesign its credit and extension services toward the needs of its members. In discussions on the development of resource-poor enterprises, researchers have expressed concern that credit is not enough for promoting long-term business viability and have called for increased effectiveness (through specialization, for example) and greater integration of services (Sievers and Vandenberg 2007; Donovan, Stoian, and Poole 2008). Along these lines, opportunities for innovation by Soppexcca would include the integration of credit and extension services. This would clearly demand high levels of training and coordination among extension staff and the ability of credit staff to incorporate more criteria into credit decisions. However, to reach the least asset-endowed members, who are also the most risk-averse members, benefits and risk-sharing mechanisms (joint investments) will be necessary.

7.3 Factors that contributed to asset building by Soppexcca

High levels of preexisting social and human capital enabled Soppexcca to respond to crises, build new links with buyers and NGOs, and expand its access to raw material. These preexisting endowments resulted directly from interventions by European coffee buyers when Soppexcca first emerged from the ashes of its failed predecessor. The support of a professional manager, who was capable of balancing the needs and realities of buyers and NGOs, as well as those of poor rural households, stands out among these interventions. The buyers had a clear objective in their support: to recuperate their financial losses from the theft of their prefinancing by the previous cooperative's administrator. This explains the buyers' insistence on a top-down administration model for the newly formed entity. This early buyer intervention provided credibility to the general manager and allowed for access to certified markets at a time when such assess was highly prized by exporters (during the height of the coffee crisis). Throughout the assessment period, some buyers provided Soppexcca with no-interest, short-term loans and permitted renegotiation of contract prices based on changes in local marketing conditions.

This experience highlights the potential of downstream businesses to invest in value chain development when the related incentives are clear and the means to intervene successfully are at hand. The coffee crisis and the resulting relatively high price for fair-trade certified coffee provided the means for securing agreement from Soppexcca's members to debt repayment, change in organizational form (from cooperative to privately held company, with the debt-holding buyers as the owners) and the selection of the general manager. By the early 2000s, buyer involvement declined, as by then a trusted general manager was in place, a plan for debt repayment existed, and NGO support was on the rise. Could NGOs have facilitated further intensive collaboration between Soppexcca and its buyers based on mutual interests and shared objectives? The literature has advocated public-private partnerships (PPP) for value chain development with smallholder producers (e.g., Hartwich et al. 2007; Rich and Narrod 2010). Case studies have typically focused on chain actors operating in the same country, where differences in culture and business practices may be smaller as compared to differences between Southern exporters and Northern importers. Evidence here suggests that further intensive collaboration between Soppexcca and its buyers would have been challenged by 1) limited production volumes of Soppexcca and buyers' need to diversity their supply base, 2) reluctance of buyers' to share core competences (roasting and marketing) with

Soppexcca, and 3) Soppexcca's reluctance to allow buyer involvement in decision-making processes and business operations.

During the assessment period, NGOs provided significant and sustained support for building Soppexcca's asset base. Through project frameworks, NGOs financed Soppexcca's credit program and a significant percentage of its operating budget. They also facilitated investments in large infrastructure and machinery. The dry-processing coffee plant would not have been possible without support from NGOs, including not-for-profit lenders. In general, the achievements of Soppexcca did not come cheaply and highlight that coffee cooperatives require significant and sustained external (outside the value chain) investment for building their assets. Others have identified the critical role of long-term external support for the building of cooperatives in value chains for certified products (Bebbington, Quisbert, and Trujillo. 1996; Lyon 2002; Ronchi 2002; Donovan, Stoian, and Poole 2008).

In their study of the cocoa cooperative El Ceibo, Bebbington, Quisbert, and Trujillo (1996) discuss the "donor dependency syndrome," whereby cooperatives fail to seek out new sources of investments and joint ventures due to dependency on NGO and project support. However, the Soppexcca experience paints a more complicated picture than that. NGOs sought out collaboration with Soppexcca because of Soppexcca's high levels of social and human capitals. In the process, Soppexcca was able to negotiate co-investments in infrastructure upgrading and contributions to its credit program. Given the turbulent environment for coffee production and marketing in Nicaragua and the limited support from the public sector, it was highly unlikely that Soppexcca could have had access to alternative sources of investment. In short, effectively linking cooperatives to high-value and competitive markets does not come cheaply, and there may be few alternatives to long-term and sustained donor support.

In addition to high preexisting levels of social and human capital, Soppexcca made an attractive partner for NGOs and buyers because of its own internal commitment to combining economic, social, and environmental objectives. The commitment manifested itself in various ways: incorporation of asset-poor base cooperatives (e.g., El Esfuerzo and Julio Hernandez), commitment to fair trade relations and organic production, encouragement of female participation in cooperatives and leadership, investment in women's health programs, targeted long-term credit for women coffee producers, and the provision of emergency credit. In general, cooperatives struggle to balance the multiple objectives related to markets and membership welfare (e.g., Barton and Merino-Pérez 2002). The relative ease with which Soppexcca adopted these goals can be traced to fair trade certification

and related partnerships (e.g., certified buyers, Max Havelaar), the coffee crisis and the perceived urgency to shift to niche markets, and the unique history of the coffee sector in Nicaragua. This history includes a strong role of cooperatives in organizing smallholder production and limited smallholder use of agrochemical inputs and other modern production techniques.

Achievements similar to Soppexcca's as related to gender equity are rare in the literature. In general, participation of women in RCE management and governance is rare, despite the fact that in several RCEs women play a critical role in harvesting and processing. Cultural factors largely prevent them from playing a more prominent role in management decision making. Murray, Raynolds, and Taylor (2006) found that among the fair trade certified cooperatives in their sample, several had launched projects for strengthening the role of women, such as education and training programmes, handcraft production and marketing, and other income-generating initiatives. But these initiatives focused on activities largely outside coffee production. They also found that more established cooperatives tended to maintain traditional patterns of gender inequality, while recently organised cooperatives fared better in changing these conditions. In Guatemala, the newer cooperatives had greater numbers of women participating as leaders (Lyon 2002). This provides additional importance to the birth of Soppexcca from the ashes of its predecessor organization and the initial decisions by the intervening coffee buyers in the selection and hiring of the general manager.

7.4 Factors that hindered asset building by Soppexcca

The policy context in which Soppexcca operates emerges as a central hindering factor in Soppexcca's asset building during the assessment period. First, the near absence of the Nicaraguan government in coffee production or processing obligated Soppexcca to invest scarce funds in the provision of technical services, despite the public-good character of these services. Moreover, the lack of a strategy for the development of specialty coffee limited coordination among cooperatives and other private sector actors and pushed cooperatives like Soppexcca to invest individually in expensive dry-processing plants that will remain inefficient without major investment in plant upgrading. Second, the market context worked against Soppexcca throughout the assessment. At the beginning of the period, when international coffee prices were at their lowest, Soppexcca's access to certified markets with relatively large price premiums over noncertified coffees was limited, thus reducing the price offered to members. Near the end of the period, Soppexcca had expanded its access to certified markets, but price premiums of certified coffees had fallen significantly,

thus reducing incentives for growers to supply to Soppexcca, despite relatively high levels of social capital between Soppexcca and its members. A more favourable marketing environment would have provided Soppexcca with flexibility to invest in asset building while maintaining price incentives for members to deliver coffee to Soppexcca. Third, there was the matter of high coordination costs resulting from the poor road and electrical and communication networks of rural Nicaragua. From a producer perspective, this reduced the attractiveness of Soppexcca vis-à-vis other buyers with decentralized credit, payment, and transport services. Finally, there was the fact that most of the Soppexcca membership had little formal education, and little, if any, experience in business or NGO relations. This presented a major challenge for Soppexcca management looking to promote greater member participation in governance.

In their analysis of collective action in Mesoamerica, Hellin, Lundy, and Meijer (2009) argued that development agencies were important in the early stages of RCE development and suggested that links to the private sector became more critical as enterprises developed. Findings here countered this argument, suggesting that strong private sector support in the early stages of Soppexcca's development was critical to building social capital with buyers and with producing households. In general, the Soppexcca findings show that both private and public sectors played a critical role in the initial stages of Soppexcca's development and that public sector support remained critical even as the enterprise had developed a substantial asset base. Moreover, evidence suggested that few options existed for more intensive buyer involvement in Soppexcca's operations during the assessment periods—as the major challenges facing Soppexcca were related to the supply of coffee from its members rather than with demand-related factors such as quality or certification. The reasons were varied but included intense local competition for coffee, Soppexcca's need to invest in debt repayment and in infrastructure expansion, and gaps and duplications in the service offer by NGOs.

Donovan, Stoian, and Poole (2008) argued that limited access to effective and timely services was a major reason behind the long periods observed for RCEs to develop into economically viable enterprises. To some extent, these findings held true for the Soppexcca case. Intensive private sector involvements (with backing from Max Havelaar) in the early stages of Soppexcca's development put it on the fast track to economic viability. However, by the mid-2000s, human and social asset building had slowed, and financial capital was still underdeveloped. By the end of the assessment period (2009), Soppexcca had yet to become a viable enterprise. Without continued NGO support, its technical assistance operations would stop

almost immediately and its credit department would shrink significantly over the midterm. The role of NGOs in fostering Soppexcca's development was acknowledged by Utting (2008) in her assessment. However, she makes no mention of potential gaps in its service offer and potential limitations by Soppexcca and its NGO partners to identify and respond to organizational development needs.

Interventions in Soppexcca by NGOs and projects generally focused on provision of technical assistance, expansion of infrastructure, and financing the credit program. With these interventions, Soppexcca increased its capacity to obtain higher quality raw material and in greater volumes (through membership expansion). These outcomes were in line with recommendations by development banks and others for Central America during the coffee crisis, namely that coffee-sector development focus on improving quality and accessing markets for certified coffee. From the perspective of long-term business viability, however, the findings here suggested that significant gaps existed in Soppexcca's asset endowment. Addressing these gaps would require services over the midterm to long term for increasing productivity at the farm level; improving the coverage and effectiveness of technical assistance; reducing costs and increasing efficiency in operations; developing platforms for conflict resolution; building the capacities of volunteer leaders; democratizing planning and decision-making processes; and building the capacity to identify lessons learned and to innovate.

Case study results highlighted the need for better monitoring, assessment, and learning by Soppexcca and its supporters if Soppexcca were to build more assets in less time and at less expense. A clear example of this was the introduction of organic production by Soppexcca as a response to the coffee crisis. The rush to implement organic production without locally adjusted good production practices and without monitoring of the related outcomes implied unforeseen costs for Soppexcca's members (reduced productivity and plant health) and Soppexcca (future difficulty to promote organic production among membership). The case study also suggested that innovation was urgently needed in the design of extension services (to increase coverage and quality) and in the provision of short-term credit (more direct linkage between credit and coffee production). While some progress was detected in the latter, much work remained regarding the former.

7.5 Asset building by Soppexcca-affiliated households

Chapter 6 began by presenting an asset index (comprised of nine variables related to productivity assets, consumption, and household composition as proxies for resilience and well-being) of the sampled Soppexcca households. The index showed

that nearly half of the sampled households improved their resilience and well-being during the assessment period. On the other hand, it showed that 25% of the sample showed no change and another 25% showed lower resilience and well-being. The index indicated that although a large group of households progressed during the period, some failed to benefit for one reason or another—a source of major concern for the design of pro-poor VCDA. More detailed household-level data were required to understand why the changes did or did not take place and the relevance of the changes (or absence of change) for resilience and well-being.

7.5.1 Lessons in natural capital development

Data on natural capital covered chains at the household level (change in land area, in area under coffee production, and in fertilizer use) and at the territorial level (potential for abuse of agrochemicals and change in wet-milling techniques). At the household level, the results were generally positive, with strong increases in landholdings and even stronger increases in area under coffee production, but with limited change in use of fertilizers (a proxy for soil fertility).

Following land reforms in Nicaragua during the 1990s, various academics highlighted the difficulties of most rural households to increase their access to land through the emerging land markets (e.g., Everingham 2001; Broegaard 2005; Bouche, Barham, and Carter 2004; Deininger, Zegarra, and Lavadenz, 2003; Broegaard 2009). Among the reasons were that formal credit remained strongly skewed against poor households, there was limited land made available for rent, and reforms were incomplete or noncredible. The results from the Soppexcca study showed how barriers to formal credit could be overcome for some households through links with Soppexcca and certified coffee markets. These results held even though formal land titles were not held by most of the sampled households. The fact that nearly one in three sampled households expanded their landholdings over the assessment period suggests that conditions were generally favourable for households to expand and intensify their agricultural production. Evidence suggested that Soppexcca played an important catalytic role in land expansion but that households also invested their own funds from the sale of basic grains and coffee, sold other tangible assets, or benefited from inheritance.

Beginning in 2005, the sharp increase in international coffee prices, combined with increased support from Soppexcca, meant that interest in and capacities for expanding coffee production were generally high across the sample. Results for the sample reflected this interest, with 59% of the sample increasing their area under coffee production. However, households from cluster 1 were the least likely to have

expanded their area under coffee. The smaller response from cluster 1 likely reflects limitations for land substitution and intensified input use. In general, a strong predictor of ability/willingness to expand area under coffee production was access to credit, as expanding coffee production requires extensive labour and purchased inputs. It is likely that households' willingness to expand coffee production also reflected reduced risk to price shocks in coffee through Soppexcca membership (and fair trade certification). Tucker, Eakin, and Castellanos (2010) argued that price shocks were perceived as particularly stressful by smallholders in Central America in comparison to other types of shocks (e.g., climate variability). While, in general, smallholders may not be fully aware of the potential benefits of fair trade (Murray, Raynolds, and Taylor 2006; Valkila and Nyugren 2008), Soppexcca proved its ability to offer favourable marketing conditions and expand its service offer throughout the coffee crisis.

Despite the importance of secure access to land for agricultural production, assessments have overlooked the issues of land tenure security (or lack thereof) as a major obstacle for smallholders to benefit from fair trade (e.g., Raynolds 2002; Utting 2008; Nelson 2009; Beuchelt and Zeller 2011). In trying to understand why some households did not expand their coffee production area, this research highlighted the struggles for land tenure by members of two base cooperatives (El Esfuerzo and Julio Hernandez), which together, made up about 16% of sampled households. Their experiences highlighted the complicated history of land tenure in Nicaragua as well as the marginalization of the rural poor in addressing the issue. It is inconceivable from a social justice perspective that poor households from El Esfuerzo should be strapped with the debt for ensuring their land titles: it was thrust upon them by government policies and it should be repaid by the government. However, reality suggests that this will not happen anytime soon. It is here that the social benefits of Soppexcca were most evident, with Soppexcca assisting in raising funds for debt repayment and providing technical assistance for maintaining coffee plantations (and thus claims to land) in the case of El Esfuerzo. Experiences from El Esfuerzo and Julio Hernandez call for increased attention to aspects of inequalities of wealth and power, lack of enforcement, and lack of impartiality by the Nicaraguan government.

Household access to synthetic and organic fertilizer served as a proxy for understanding soil fertility on coffee plantations. In general, the literature has recognized the positive relationship between soil fertility and increased household income (e.g., Yamano and Kijima 2010). In the case of organic fertilizers, results showed that most households used insufficient organic fertilizer to maintain reasonable levels of coffee productivity. More intensive application of purchased organic fertilization (chicken-manure based) was frustrated by high costs (including

transport costs, as more organic fertilizers than inorganic fertilizers must be applied to reach the same level of yields) and limited income by households (for purchase and application). Valkila (2009) argued that large quantities of organic materials were available for the manufacture of organic fertilizer in Nicaragua but that labour costs were high for its production. Results here told a different story. Some organic materials were available but not the ones that supplied major amounts of nitrogen (e.g. cattle or chicken manure). Skills, tools (e.g., thermometer) and infrastructure (e.g., shed for storage) for producing organic fertilizers on farm were also major constraints. Valkila skipped the larger question of how to improve access to fertilization for smallholders, taking into account the context in which they operate. The case study brought to light years of struggle by Soppexcca to identify effective and affordable fertilizer options for organic and conventional coffee production.

Among households that produced conventional coffee, data suggested that recent usage had increased due to 1) changes in Soppexcca's credit program (i.e., inclusion of fertilizer purchase as part of short-term credit allocation rather than the provision of cash) and 2) bulk purchase and distribution of fertilizer by Soppexcca. However, the asset poor from cluster 1 were more likely to have a negative nitrogen balance in coffee production—again, highlighting the limitations of these households to build their asset base. Path dependency may also have played a role in household decisions about fertilizer usage, as many did not apply inputs to their coffee plantation prior to becoming organically certified. In general, without more focused attention on issues of fertilization by Soppexcca, its partners, and the Nicaraguan government, there is little reason to think that higher coffee prices or changes in the credit program will induce meaningful change across the sample. Debates concerning the role of government in promoting fertilization by smallholders in Africa have resurfaced recently (e.g., Ariga and Jayne 2009; Dorward and Chirwa 2011). Such debates are urgently needed for smallholder production of coffee and other crops in Nicaragua and other parts of Latin America. In the case of organic production, debates must include standards-setting agencies and civil society.

Environmental impact assessment was not conducted as part of this research, although its significance for sustainable management of natural capital is important. Most sampled households applied little or no herbicide to their coffee plantations before or during the assessment period. Few households reported using significant quantities of systemic chemicals for coffee production. The reduced dumping of wet-milling waste, however, represented a major change in production practices. Prior to the assessment period, most of the sampled households discharged wet-milling wastes directly into surface water. At the end of the assessment period, only 25% of

households discharged coffee without treatment. Soppexcca was identified by the households as having played an important role in influencing the change. This funding highlighted the potential for Soppexcca to influence change when technologies are relatively simple and required inputs are available to smallholders.

7.5.2 Lessons in human capital development

Authors have argued that smallholders can improve their human capital when affiliated with RCEs (e.g., Kaganzi et al. 2009) or value chains (e.g., Escobal, Agreda, and Reardon 2000). To some extent, the Soppexcca case supported this argument (e.g., implementation of improved harvest and postharvest techniques for quality control). When coffee-producing households were able to understand the production problem and had the resources to address the problem, they generally did so. In the case of enhanced coffee quality, the changes required were mainly improved techniques for harvesting and postharvest management, including wet milling. The upgrading of these skills was a priority of NGO interventions and thus of Soppexcca technical staff. The selection process for harvesting coffee was one of the most common changes identified in coffee production practices—despite the increased use of labour required. Roughly 10% of the sample expanded into cocoa production during the assessment period with the help of Soppexcca-provided training and inputs. While the number of households involved in cocoa production was relatively small, the implications of the cocoa production are potentially large for Soppexcca's members, as it is compatible with coffee production and has a relatively secure market.

However, the Soppexcca results also paint a more complex picture of human capital development than has been painted in the literature heretofore. If the learning and the uptake of new skills for agricultural production implies uncertainty, reduces short-term income flows, or requires complementary assets (e.g., financial capital), then related learning tends to be limited to those households with relatively large asset endowments. This was the case with the implementation of good production practices for coffee among Soppexcca members. Moreover, evidence suggests that Soppexcca and its supporters placed relatively less emphasis on increasing productivity than increasing quality. An asset-based assessment shows the need for the reverse in development priorities. While other researchers have highlighted the low productivity of the smallholder coffee production in Nicaragua (Wilson 2010, Beuchelt and Zeller, 2011; Valkila 2009), they have not identified lack of human capital, or the limitations to build human capital when overall asset endowments are limited, as a major cause.

Households' perceptions of the overall limited utility of technical assistance increased the validity of this finding, as well as key informant interviews with the leader of Soppexcca's technical assistance unit that highlighted the challenges for operating the extension program. In general, households were critical of Soppexcca's extension services, with many households identifying irregular and infrequent visits over many years and limited utility of visits. Possible reasons for the limited satisfaction with the extension services include: 1) limited incentives for good performance, 2) poor training, 3) cumbersome administrative and project-related duties (e.g., estimating crop harvest, training events on issues not related to coffee production), and 4) lack of monitoring and prioritization of households based on need.

In addition to an incomplete service offer, another possible reason why the sampled smallholders did not change from low-input to more intensive production for coffee is related to the perceived risks from the change (especially as related to tree crops with their relatively long investments periods) and lack of risk management tools (including effective technical services).

Discussions on the link between smallholders and collective enterprises tend not to dwell on the limitations of the latter to deliver effective services for coffee production to the former. For example, Utting (2008) argues that "the issue of empowerment of small producers is directly related to the role of producer organizations." However, evidence here and elsewhere (e.g., Valkila 2009; Wilson 2010) suggests that increased productivity in coffee is critical for long-term empowerment and that RCEs face major limitations in designing and delivering technical assistance and other critical services. In her review of the fair trade impact literature, Nelson (2009) discusses empowerment from participation in fair trade in various ways (e.g., self-confidence, ability to negotiate, producer knowledge of fair trade), none of which include empowerment to build assets through more intensive participation in value chains for coffee and other crops. Discussions of empowerment in the context of speciality coffee value chains and poverty must include productivity and the ability of the poor to increase productivity through their links with collective enterprises and other value chain actors.

Of course, limitations to apply good production practices in coffee were not only the result of limited knowledge—application of good production practices implied higher labour and inputs costs, which some households were unable to bear. This was particularly evident in the case of households headed by females (with no male counterpart). Evidence suggested that female-headed households, which made up about 17% of the sample, faced many major limitations to investing their scarce labour in coffee production. Female-headed households showed significantly lower

performance in coffee production than two-headed households and in general depended on off-farm employment for the majority of their income. These results support previous research from Africa on the limited ability of female-headed households to participate effectively in formal markets for agricultural products (e.g., Zeller, Diagne, and Mataya 1998; Quisumbing and Pandolfelli 2010). In general, experiences from Africa, as well as those from the Soppexcca case, suggest the need for greater attention to the potential trade-offs between livelihood activities as well as to the specific needs of women in building an asset base that would allow for effective participation in value chains over the long-term.

7.5.3 Lessons in social capital development

Assessment of social capital aimed to capture changes in the ability of households to build assets through their relationships with coffee buyers. The Soppexcca results highlighted the mismatch between social capital building from the enterprise perspective and social capital building from the perspective of asset-poor households. For Soppexcca, social capital building may be best expressed through increased member loyalty, which leads to increased export volumes, increased efficiencies and high income for Soppexcca, and improved and expanded Soppexcca service offer for its members. This is the social-capital development scenario often assumed by writers in the literatures on collective enterprise and fair trade certification (e.g., Bacon 2005; Utting 2008; Kaganzi et al. 2009). However, for Soppexcca's members, the household-level results showed that increased social capital from value chain relationships often implied access to Soppexcca-provided services, as well as access to complementary services provided by other coffee buyers. The need for complementary services from other buyers allowed households to compensate for their overall low asset endowments and vulnerability to shocks. In this case, interest in survival and security in the present led households to maintain relationships with various coffee buyers, despite that fact that such actors imply reduced income benefits in the present and reduced security in the future—a situation outlined by Wood (2003) in his discussion on the "Faustian Bargain" faced by the rural poor.

Linkages to value chains for certified coffee through Soppexcca offered: access to credit, technical assistance, development projects, and emergency assistance. However, the study highlighted the variety in services offered by other coffee buyers that responded to different needs of asset-poor households. For example, local market buyers provided low-cost and dependable access to buyers with relatively low quality requirements. Most market buyers had expanded their

provision of short-term credit throughout the year. The most common credit involved the provision of basic grains and other foodstuffs to coffee producers, rather than cash, which was repaid with interest in coffee following the harvest, according to market price. In some cases, intermediaries had emerged whose service offer rivalled that of Soppexcca in various ways. The intermediary, Osman Martinez, lived in the area where he purchased coffee, which reduced coordination costs with coffee growers for the provision of technical assistance, short-term credit, transport, emergency credit, and payment for coffee. Prices were comparable to those offered by market buyers; however, payment was on the spot, without the need to transport coffee to the market.

Qualitative information on the reasons for side selling highlighted the role of credit from non-Soppexcca sources to fill short-term income gaps that allowed households to meet harvest-related expenses (hiring of labour for harvest and meeting increase food consumption of family labour) and household expenses (e.g., school expenses, food security). In this light, side selling was a logical response to coffee production where assets were limited and vulnerability was high, due to lumpy income flows, low productivity in coffee, and limited income-generating options outside of coffee, among other factors. Several factors limited the ability to Soppexcca to capture more of its members' production, including having the highest quality requirements of all buyers, limited amounts of short-term credit, rigid and centralized payment, and credit systems that allowed limited flexibility in addressing household needs/realities for funds. Some authors have suggested that households sell outside the cooperative mainly because of higher prices offered by local coffee buyers (e.g., Reuter 2010) or because buyers fail to provide effective services (Kaminski, Headey, and Bernard 2010). However, evidence here suggests that neither relative prices nor major failures of Soppexcca in service provision featured prominently in households' selling decisions—the major factor was access to expanded credit services that filled income gaps during the year and increased overall resilience. This has important implications for policies designed to access side selling by cooperatives, other downstream chain actors, and external supporters, such as NGOs.

The findings on social capital bring to light an important issue in the design of VCDA in coffee. From the perspective of Soppexcca, the fact that significant volumes of coffee production were sold to other buyers despite its investments in credit and technical assistance (among other services), increased its risk of noncompliance with downstream buyers and reduced its overall economic viability. However, higher sales to Soppexcca by member households will only be obtained with increased resilience

(including resilience to food insecurity) at the household level and by a more tailored and agile service offer by Soppexcca that responds to the consumption and production realities of households during the year. This study showed that addressing issues of food security and overall low levels of preexisting asset endowments will be critical to designing pro-poor value chain development interventions.

7.5.4 Lessons in physical capital development

On a positive note, favourable marketing conditions for coffee, combined with interventions by Soppexcca (mainly credit and technical assistance) to improve coffee quality and promote environmentally sound production, facilitated investments in physical capital for coffee production. On the other hand, investments in wet-milling infrastructure provided little relief from chronically low productivity levels and high risk in coffee production, and investments in physical capital for other agricultural activities (e.g., basic grain production, tree-crop production, timber extraction and processing) were considerably smaller. Cluster membership proved an effective predictor of increasing physical capital. For example, households from cluster 3 made up 40% of all the households that invested in expanded/improved infrastructure and machinery for wet milling, with an average investment of more than two times that of households from cluster 2 and more than three times of those from cluster 1. In short, expanded physical capital among asset-poor households during the assessment period offered the potential to enhance quality and environmental performance but provided limited benefits for a more intensified and diversified agricultural production.

Data on investments in housing infrastructure further supported the argument that Soppexcca members faced major challenges for investing in physical capital despite the upturn in coffee markets. For example, only 17% of households in cluster 1 reported any addition or improvement to housing infrastructure during the five-year assessment period. This suggested that additional income from increased coffee prices may have allowed for investments in natural capital or for increased household consumption, though it was insufficient to allow for improvements in basic housing infrastructure. These findings supported those by Utting (2009, 137), who concluded that “little evidence was found of improvements to the physical structure, including the walls and roof of their homes, even though most [interviewed Soppexcca members] described the poor condition of their homes and their desire to reinforce them with concrete walls and a more solid roof.”

Promoting investments in households’ physical capital (particularly machinery and equipment for soil preparation, weed control, postharvest management, and processing) that increase productivity and expand options to add value to coffee and

other crops (e.g., basic grains) through savings and credit programs or other means can increase the return to land and labour resources, raise incomes, and improve food security. Discussions on the impacts of value chains, certification systems, or RCEs have yet to address this issue.

7.5.5 Lessons in financial capital development

During the early years of the coffee crisis, researchers argued that higher prices for coffee through participation in value chains for certified coffee would provide a viable option for the development of smallholder coffee production in Central America and elsewhere (Harris et al. 2001; IADB/USAID 2002; Varangis et al. 2003; Bacon 2005; Calo and Wise 2005; Jaffee 2007). The analysis of the financial capital of Soppexcca's members highlighted the potential for VCDA to alleviate the effects of extremely limited asset endowments and income flows, even if such contributions do not lead to additional asset building or provide a secure pathway out of poverty. In this sense, the findings support recent studies arguing that higher prices for certified coffee have been insufficient to address chronic rural poverty among smallholders and their labour providers because of limited production volumes and small landholdings (Valkila and Nygren 2008; Valkila 2009; Barham et al. 2010; Beuchelt and Zeller 2011). The findings of this research add an additional level of complexity to current discussions, arguing that the lack of preexisting assets for effective participation in value chains for certified coffee are a major reason behind the low productivity and overall limited ability to intensify coffee production.

In many cases, sampled households offered products in various local and natural markets in addition to coffee, for example: beans and bananas for regional markets and citrus for local markets, as well as providing labour for coffee production on other farms. However, opportunities to significantly increase or diversify income through the sale of other products and services in Nicaragua were severally limited. Contributions from the marketing of other agricultural products, such as citrus and bananas, provided steady income during the year but contributed relatively minor amounts to total income. The effects of constrained and generally lumpy income flows influenced the building of social capital (e.g., side selling), natural capital (e.g., limitations to improve soil quality), physical capital (e.g., limited investments in infrastructure, machinery and tools), and human capital (e.g., limited ability to dedicate more household labour and access hired labour for coffee production). Utting (2008) provided similar evidence of the overall dominance of coffee production for total income generation by Soppexcca members (96% of total gross income in 2005).

In general, discussions on household economy for coffee producers have focused only on coffee-related income (e.g., Valkila and Nygren 2008; Wilson 2010). Increasing the returns from off-farm labour and from the sale of products other than coffee may provide opportunities to strengthen livelihoods at a relatively lower cost (both to households and to development interventions). For organic coffee producers, certification did not provide price benefits for the sale of other producers produced on-farm, as these products were sold as conventional products in local or national markets. Again, the promotion of the organic cocoa production by Soppexcca has the potential to change positively this situation. However, in general, the development of value chains for organic cocoa in many parts of Central America has proven to be a challenge (e.g., Donovan, Stoian, and Poole 2008), thus highlighting the importance of a complete service offer for cocoa production by Soppexcca and others.

The large contribution of coffee to total income for Soppexcca members counters findings by Barham et al. (2010), who found that coffee producers in southern Mexico derived 65% of their total income from subsidies, remittances, and off-farm employment, while deriving only 19% of income from coffee production. For all but one region included in their study, nonagricultural wages were reported to be two and three times what farmers could earn working their own organic or conventional coffee plots, respectively. Thirteen percent of their sample reported a member working locally as a nonagricultural labourer. Households also benefited from government stipends that covered education costs for children. In the case of the Soppexcca sample, only 3% of households reported access to nonagricultural labour opportunities, while stipends for education were equally rare (and often provided by Soppexcca, not the government). Based on these findings, Barham and colleagues argued for an integrated approach to smallholder development that improves productivity and prices and supports other pathways for improving incomes. The findings of this thesis strongly support such recommendations, highlighting the need for long-term commitments to such an approach given lack of government support and the limited development of alternative markets for on-farm production and off-farm employment.

Evidence suggested that participation in certified coffee markets through Soppexcca provided meaningful income benefits for households in clusters 2 and 3 that produced conventional coffee and for all households that produced organically certified coffee. In general, the data suggested that organic producers earned more income from coffee production than low-input conventional producers. However, the data did not allow for comparison of the income benefits between conventional and organic. Valkila (2009) compared low-intensity coffee production and coffee yields

between conventional and organic coffee producers in Nicaragua. He found that organic certification slightly improved income compared with the low-intensity conventional production because the organic price premium was available and costs of production were generally low for both low input organic and conventional products. However, as input usage for organic coffee production increases, the economic benefits become less certain due to higher production costs. Valkila considers why producers would grow coffee organically, even when the economic advantages are not always clear. He offers that producers recognized the price stability with organic coffee, were proud to be identified as ecologically sound producers, and were concerned about their health.

Analysis by Beuchelt and Zeller (2011) estimate production costs for organic coffee rather than using estimates from secondary sources (e.g., Valkila 2009). They estimated that while farm-gate prices for certified coffee were higher than those for conventional coffee during the late 2000s, the profitability of certified coffee production is uncertain due to higher production costs related mainly to higher use of hired labour. The authors argued that per capita net coffee incomes were generally insufficient to cover basic needs of all the coffee-producing households. Moreover, they argued that organic producers had become poorer relative to conventional producers due to the rising price for conventional coffee. The strength of these findings depends heavily on the production cost estimates for conventional and organic coffee. Beuchet and Zeller considered the following costs: variable input costs (fertilizer and weed control), hired labour for coffee harvest, and other hired labour costs. However, experiences in data collection for this research highlighted the difficulties of collecting reliable data on labour costs: these costs vary by year and across production activities depending on 1) expected yields and 2) income available for the purchase of inputs and hired labour. In the case of Soppexcca, production practices for low-input conventional and low-input organically certified production were similar (the main difference being the use of weak doses of herbicides to lower weed control costs by conventional producers)—and, in general, neither producer type applied purchased fertilizers on a regular basis or applied farm-produced fertilizer other than dried coffee pulp. Thus, this research suggests that that question remains open whether organic producers are poorer than their conventional counterparts.

As noted previously, short-term credit played an important role in facilitating the building of natural and physical capitals. Evidence also suggested that it reduced household vulnerability to major biannual fluctuations in coffee production, helped to smooth consumption over the year, and provided funds for covering the costs of the

coffee harvest (a period when overall income flows are typically most constrained). Just prior to the assessment period, few of the interviewed households reported access to credit sources. During the assessment period, 85% of the sampled households reported access to at least one short-term credit. However, most households were not able to receive credit on a yearly basis, and evidence suggested that households faced major difficulties in repaying short-term credit obligations due to variations in coffee production and overall limited low production volumes. Soppexcca was the main source of long-term credit for its members, supplying just more than half of the long-term credit obtained for expansion of infrastructure, machinery, and tools, as well as for the purchase of livestock. Here too, however, evidence suggested that households struggled to repay long-term credit obligations. These findings support the argument made by Wilson (2010) that smallholder coffee producers in Nicaragua are caught in a debt trap. Wilson identified various reasons for this situation, many of which are supported by evidence from this study, including fluctuating yields, rising consumption and production costs, rising wage labour costs, overall low credit amounts (sufficient for only the most basic of productive activities), and the use of credit for household consumption. Breaking the dependence of the asset-poor on credit requires major investments in building their overall asset base and reducing the risks of food insecurity.

7.6 Factors that contributed to asset building by households

Carter and Barrett (2004) argue the importance of a dynamic view of asset building and the notion of asset thresholds, above which households are more likely to reach a higher level of returns to their assets and emerge out of poverty over time. However, Carter and Barrett provide limited insight into which assets the poor can accumulate and the processes by which they accumulate them. Various other authors have highlighted the limited potential for higher prices for certified coffee to impact household well-being when natural and financial capital endowments are highly constrained. In this sense, two factors were considered critical for asset building by the sample: preexisting asset endowments and access to Soppexcca-provided services. Discussions on preexisting asset endowments consider two thresholds: a lower threshold, above which households achieved minimum levels of asset building through participation in value chains for certified coffee, and an upper threshold, above which households achieved significant increases in their asset endowments.

Households intensified their human capital endowments to varying degrees during the assessment period through more sophisticated coffee production methods

and, in some cases, new skills for diversifying their on-farm production. The magnitude of these changes and the degree to which the changes represented real increases in overall livelihood security depended on access to complementary assets. Meeting the lower threshold implied that a household had surplus household labour for intensifying coffee production and had minimum knowledge of basic coffee production techniques. During the assessment period, these households showed new skills for improving the quality of coffee (e.g., better wet-milling and harvesting techniques), implementation of low-input organic production, understanding of good production practices for coffee, and diversification of on-farm production (e.g., production of cocoa). In general, the households had a male head, belonged to cluster 2, were in the middle- to upper-middle age bracket, and derived most of their household income from on-farm agricultural production (or from more lucrative, year-round nonagricultural employment). Relatively few complementary assets were required to meet this threshold, namely: land with a preexisting coffee plantation and minimum levels of financial capital for meeting increased production costs associated with improved production methods.

Meeting the upper threshold implied that households had, in addition to sufficient labour and basic knowledge of coffee production, sufficient access to more or less high levels of complementary assets, namely: relatively large land endowments, access to sufficient credit for acquiring production inputs and labour services, and diversified income sources that allowed greater risk taking. During the assessment period, households that met the upper threshold built their human capital through implementation of intensive organic production practices, improvements in coffee production practices for increased productivity and quality, and diversification of on-farm production. Households meeting this upper threshold typically came from cluster 3 and from a limited number of relatively asset-rich members of cluster 2. The overall limited number of households that meet the upper threshold for the building of human capital raises questions about the effectiveness of technical assistance programs that are designed and implemented without paying attention to the underlying conditions that limit households' ability to apply human capital to more intensive on-farm production.

In general, natural-capital endowments following the coffee crisis were highly deteriorated after years of reduced and forgone investments. By the end of the assessment period, many households had realized sizable investments in building natural capital, which offered potential for restoring their natural capital asset to precrisis levels. As above, two thresholds levels described the ability of the sampled households to build their natural-capital endowments. The lower threshold for

building natural capital consisted of having reasonably secure access to their land with productive coffee plantations. With the exception of households from El Esfuerzo and Julio Hernandez base cooperatives, households at the beginning of the assessment period generally met this threshold (some exceptions included members from other base cooperatives that had abandoned their coffee plantations because of plant disease or insufficient labour). During the assessment period, these households were able to access short-term credit (used for various purposes, including coffee production) and long-term credit for rejuvenation of coffee plantations and expansion of land area. The overall relevance for asset building, however, depended on access to complementary assets that would have allowed increased investments in soil fertility and development of more intensive agroforestry production systems.

The upper threshold for building natural capital consisted of having, in addition to secure land access, relatively large landholdings and endowments of human, social, and financial capitals. These complementary assets allowed for consistent investments in soil fertility (fertilizer application) and more intensive agroforestry production systems (with relatively high productivity in coffee and a range of products). Strong social capital endowments implied that they have access to short-term credit from several sources, as well as to various outlets for marketing their coffee. Human capital included relatively large household sizes with productive activities focused on on-farm production for the market. Households that reached the upper threshold for natural-capital building tended to be producers of conventional coffee from cluster 3. These few households provided most of the coffee supplied to Soppexcca.

As for financial capital, access to short- and long-term credit was the major change experienced by the sampled households during the assessment period. The fact that so many households gained access to credit for the first time during this period reflected 1) the poor state of the Nicaraguan financial services sector prior to, during, and after the coffee crisis and 2) the ability of Soppexcca to offer acceptable credit terms to households that otherwise would not have taken credit. Among the various credit sources, three offered favourable terms (e.g., 12% to 15% interest per year): Soppexcca, the local intermediary Osman Gutierrez, and the direct exporters (Atlantic and CISA). In addition to these preferred sources, many households accessed credit from local market buyers throughout the year but at considerably less favourable terms (approximately 60% interest per year). During the assessment period, households that met the lower threshold level of preexisting assets were able to access credit from one preferred source, mainly Soppexcca, in addition to local market coffee buyers. These households, mainly from clusters 1 and 2, had sufficient

natural and human capital endowments to provide a coffee production stable enough to cover basic needs, thus offering a higher chance of compliance with contractual obligations for delivery of coffee (for debt repayment) to Soppexcca. Overall credit amounts provided by Soppexcca were generally small and covered only the most basic activities for coffee production. Thus, the upper threshold considered the ability of the sampled households to access credit from Soppexcca and other sources, mainly Osman Gutierrez or a direct exporter. However, meeting this threshold required high levels of social capital and, in many cases, relatively large endowments of natural and human capitals (for direct relations with an exporter).

By the end of the assessment period, some households had realized sizable investments in physical capital, which offered households the potential to intensify their on-farm production in coffee and other products. The lower threshold for building physical capital consisted of improvements and expansions in tools, machinery, and infrastructure for wet-milling. Meeting this threshold implied that households had preexisting levels of natural and human capitals that permitted sufficient coffee production to repay long-term credit and otherwise invest in coffee production. Households in clusters 2 and 3 were able to invest in wet-milling improvements. The relatively equitable level of investments reflected Soppexcca's overall support for improving the quality of coffee produced by its members through technical assistance, training, and long-term credit. The upper threshold consisted of major investments in tools, machinery, and infrastructure (other than wet-milling), for which Soppexcca-provided credit was generally unavailable. Only a relatively few households from cluster 3 were able to meet this threshold, suggesting that relatively large endowments of natural and human capital from outside the coffee system were required.

Unlike the other capitals, the factors that contributed to social-capital building depended less on preexisting asset endowments and more on the design of services offered by Soppexcca. For those households with the least amount of assets, the benefits related mainly to assistance with land tenure and access to emergency credit and other social services. For most households, Soppexcca represented an important coffee buyer that contributed to increased earnings from coffee and reduced the risks of major negative fluctuations in coffee markets, as well as being an additional source of short- and long-term credit and other services. Soppexcca's ability to offer services to its members was due to the extensive support from NGOs and buyers over the assessment period. As noted previously, such support would not have been possible without Soppexcca's high levels of preexisting social and human capitals or without its participation in certified fair-trade markets. Fair trade relationships offered

Soppexcca access to no-interest loans from its buyers and low-interest loans from specialized fair-trade lending organizations. Fair trade certification also facilitated the investments by NGOs and donors looking for partners in addressing the coffee crisis, in particular, and in promoting the smallholder coffee sector, in general.

7.7 Factors that hindered to asset building by households

Carter and Barrett (2004) argued that "poverty traps" explained why those households with the least assets stay poor over time. These households earned lower rates of return on their already modest asset endowments and thus had less surplus for investments after meeting immediate consumption needs. Building their asset base required increased savings (reduced current consumption), increased earnings through additional work or other income sources, and/or access to new credit sources. If poor households are unable to increase savings or have limited access to new income-generating or credit opportunities, then they settle into a poverty trap, where they do not accumulate the assets that would allow them to achieve higher returns on their existing assets. Various authors have identified the difficulty of smallholder coffee producers in Nicaragua to accumulate assets through increased earnings from certified coffee sales (due in part to their general lack of natural and financial capital) or to stimulate asset accumulation and higher asset returns through access to credit. Evidence from Soppexcca-affiliated households suggested that they faced limited opportunities to identify and participate in value chains for higher-value markets other than coffee and faced extremely limited opportunities for nonagricultural employment.

Researchers have evidence that relatively poor households may not benefit from development interventions due to their low levels of preexisting assets. In Bangladesh, Hallman, Lewis, and Begum (2007, 132) argued that households' responses to improved fish-farming technologies were muted due to low levels of certain assets: "Technologies that require high threshold levels of certain assets, such as land or financial capital, are likely to exclude the poor unless programs find other arrangements to work around the assets they lack. An important lesson from this study is that program approaches intended to overcome the low asset stocks of the poor—and therefore allow them to adopt technologies—may be extremely difficult to design and tailor in practice." In Kenya, Place et al. (2007, 189) assessed the livelihood impacts on interventions for soil fertility replenishment practices (SFP). They found that even through SFP were taken up by a number of poor households, their impact was limited by the small percentage of land under SFP and the overall weak rural economy. In Bangladesh, Hossain et al. (2007) argued that relatively rich

households achieved direct positive impacts from the adoption of modern rice varieties (e.g., higher yields, lower costs), while the poorer households received mainly indirect benefits in the form of increased employment in rice production and reduced real price of rice. While these studies provide insights into how technologies shape rural livelihoods, they do not probe deep enough into household needs and realities to provide evidence of poverty traps and related exit strategies.

The Soppexcca case study provides clear evidence that a poverty trap existed for a significant subgroup of households. For them, the overall impact of participation in value chains for certified coffee was insufficient to overcome the trap during the assessment period. The reasons for the trap included insufficient preexisting assets, incidence of major shocks (e.g., coffee crisis, Hurricane Mitch), marginalization from political processes, and limited access to services for building assets. Natural-capital endowments were highly constrained due to lack of investment (from inability to recover from the coffee crisis or unresolved land conflicts) and the limited size of area under coffee production. For these households, coffee production permitted access to credit from buyers in the markets of Jinotega (in exchange for basic grains). These households had limited access to Soppexcca-provided credit and faced trade-offs to dedicate more household labour to on-farm production. Moreover, they had limited capacities to implement improved coffee production techniques due to lack of human and financial capitals, combined with a limited ability to assume risks involved in the change of production techniques. The need to fill income gaps during the year implied that a limited amount of their coffee was sold to Soppexcca. These households were more likely to be from cluster 1, have a single household head, produce conventional coffee, and depend on temporary off-farm work (mainly during the coffee harvest season) for a significant part of total annual income. For these households, preasset endowments allowed for only modest asset building through their participation in Soppexcca. That said, Soppexcca represented an important focus of risk reduction in the form of 1) emergency loans and social services and 2) insurance against major reductions in coffee prices.

In addition to limited preexisting assets, marginalization from decision-making processes hindered asset building. The struggle by members of El Esfuerzo base cooperative highlighted the extent to which the poor are excluded from judicial processes for land tenure. As long as the members of El Esfuerzo are left holding the debt incurred to defend their land rights, there is little possibility for them to accumulate assets through any type of on-farm production. Marginalization from decision-making processes was also evidenced in Soppexcca, for example through the limited consultation on investment in the dry-processing plant, the limited ability of

Soppexcca's volunteer leaders to effectively carry out their oversight roles, and the limited accountability of the technical assistance programs. Decisions by donors and buyers to focus their interventions on improving coffee quality (rather than increasing productivity and strengthening food security) reflected limited appreciation for the needs and realities of the poorest producers among Soppexcca's membership.

Finally, the overall context in which Soppexcca's members operated during the assessment period was generally not conducive to asset building or reduced vulnerability. Vital services were missing, including insurance and other risk-reducing services and mechanisms, technical assistance for crops other than coffee, and access to tools and land for more intensive basic-grain production. Transportation and electricity infrastructure increased production costs and increased the risks of noncompliance with requirements for coffee quality. Markets for other products derived from coffee plantations (e.g., bananas, citrus, and timber) were highly underdeveloped. During the assessment period, costs for basic foodstuffs and fertilizers reached near-crisis levels in Nicaragua and other parts of the developing world. Addressing these changes in the overall context in which Soppexcca members operate required urgent and coordinated action if value chains for coffee and agricultural and forest products were to reduce poverty among the most vulnerable smallholders.

7.8 Differences in asset building across clusters

The analysis of asset building across clusters of farming households in response to development interventions allows for more-targeted policy recommendations and sets this research apart from similar studies that employed an asset-building framework. For example, none of the case studies presented in Adato and Meinzen-Dick (2007), which dealt with the impacts of agricultural research on rural livelihoods, made a genuine effort to draw insights for better policy based on preexisting differences in livelihood strategies or asset endowments. Several of the Adato and Meinzen-Dick case studies concluded that agricultural research had had modest to limited impacts on strengthening rural livelihoods (e.g., Bellon et al. 2007; Hossain et al. 2007; Place et al. 2007). This likely reflected the limited nature of the interventions (technology development for a single crop) being assessed. Altogether, the cases provide limited insights into how to better design policies for the generation and transfer of agricultural technology to the rural poor. Earlier research by Moser (1998) on assets and vulnerability did not recognize the role of differences in preexisting assets on the outcomes of asset building, nor did the more quantitative work by Carter and colleagues (e.g., Carter and Barrett 2004). It is argued here that applications of asset-

building frameworks benefit from a nuanced understanding of the realities of different types of households, complex interventions, and effects on multiple and diverse strategies.

The remainder of this discussion examines the insights gained from the comparison of asset-building results by Soppexcca-affiliated households according to their cluster assignment.

Cluster 1: limited ability to build assets through value-chain participation

Overall experiences with the accumulation of natural capital by the cluster 1 households during the assessment period provided relatively positive, albeit mixed, experiences. A surprisingly high percentage of these households expanded their total landholdings (21%) or expanded their area under coffee production (38%). These results were not markedly different from changes in landholdings and area under coffee production by cluster 2 households (although they were considerably smaller when compared to similar changes by cluster 3 households). For the cluster 1 households that increased their landholdings and area under coffee production, full or partial attribution to Soppexcca and its marketing and credit services was possible in many cases. Given the lack of options for agricultural diversification, combined with the need to recuperate natural-capital endowments following the coffee crisis, any increase in area under coffee production was likely to provide additional income sources and improve resilience in the midterm.

However, in other areas of natural-capital building, the performance of cluster 1 households was low in both absolute and relative terms, with likely negative consequences for sustainability. For example, cluster 1 members who produced organic coffee were 50% less likely to use compost for coffee fertilization than their cluster 2 counterparts. Only 16% of cluster 1 organic producers used Biogreen between 2007–2008 and 2008–2009 for coffee fertilization, compared to roughly 50% of cluster 2 organic producers. Among households that produced conventional coffee from cluster 1, low fertilizer use in coffee production was equally worrisome, with roughly 35%of households applying as little as one bag of fertilizer in a given year—roughly 50% of the usage rates of households in cluster 2. One positive sign in fertilizer usage was the increase by cluster 1 households in 2008–2009 in response to the linking of Soppexcca-provided credit with fertilizer purchases. Where relatively small investments in human and financial capital were required for upgrading natural capital, such as the application of improved wastewater-disposal techniques, the take-up by cluster 1 households was high and the differences between results for households from cluster 1 and 2 were small.

Results suggested that cluster 1 households were less likely to have developed improved skills or capacities for the application of good coffee production practices during the assessment period than households in other clusters. For example, roughly three-quarters of the households that exhibited the lowest productivity in coffee among all sampled households (and thus practised the least intensive form of coffee production) belonged to cluster 1, while the majority of households that had achieved relatively high productivity levels through new skills for plantation management belonged to cluster 2. With roughly 22% of households in cluster 1 headed by females (nearly twice the percentage of single-headed households in cluster 2), efforts to build human capital must recognize the limited labour capacity for coffee production and the related need for labour-saving technologies. Households from cluster 1 were also the least likely to have acquired or implemented new skills for improving their coffee quality, such as improved techniques for harvesting or wet milling. In general, households from cluster 1 practised no-input and low-skill production techniques prior to the assessment period and were unable to improve production in response to interventions for building human capital by Soppexcca and others.

Changes in social capital among households in cluster 1 were generally positive and of a magnitude equal to, if not greater, than the corresponding changes for households in clusters 2 and 3. Most households from cluster 1, like those from cluster 2, sold their coffee to only one type of coffee buyer prior to joining Soppexcca—usually a local intermediary. During the assessment period, the majority of households from all clusters developed links with Soppexcca while maintaining their links with previous coffee buyers—thus, effectively increasing the flexibility and range of services offered by buyers in general. Households from cluster 1 were generally no more or no less likely to sell their coffee outside of Soppexcca than households from other clusters. Households from cluster 1 were the least likely to have received credit for agricultural production prior to the assessment period. However, their access to credit during the period was nearly equal to that of households from cluster 2. Qualitative evidence suggested that households from cluster 1 benefited significantly from other socially oriented interventions by Soppexcca, such as the donation of coffins and school supplies, provision of emergency credit, facilitation of medical services, and assistance with land tenure conflict.

Similar to their experiences in the building of human capital, cluster 1 households struggled to build their physical-capital endowments, and results for the assessment period showed that their achievements were markedly lower than those

of households from clusters 2 and 3. The mean total investment in physical infrastructure for coffee production among cluster 1 households producing conventional coffee was 61% and 33% of similar investments by households from clusters 2 and 3. Similar results were identified for households producing organic coffee. Moreover, few households from cluster 1 had the resources to improve their housing infrastructure during the assessment period. Where improvements were identified—for example, the construction of a new latrine—local NGOs and government agencies were identified as having provided the resources for the investments. Interestingly, no major difference was identified in the ability to upgrade housing infrastructure between cluster 1 households and those in clusters 2 and 3. This suggested that households, when possible, prioritized investments in coffee production over those of housing infrastructure, potentially in response to the urgent need to recuperate natural capital following the coffee crisis as well as the relatively high price for coffee during most of the assessment period.

The financial capital analysis showed that cluster 1 households improved their income flows only marginally through their participation in the certified-coffee value chain. Given overall low productivity levels, the potential for major gains in income were limited form the start. However, the need to sell coffee outside of Soppexcca, despite Soppexcca's higher prices, significantly reduced income benefits. For many cluster 1 households, qualitative evidence suggested that shortages of cash prior to the coffee harvest season required households to seek sources of coffee-based credit from local intermediaries. Cluster 1 households generally received only half of the amount of short-term credit from Soppexcca as households in cluster 2 and only a small fraction of long-term credit from Soppexcca received by households in cluster 2. This demonstrated the overall difficulty faced by cluster 1 households to intensify their coffee production and increase their income flows from noncoffee related productive activities (and the related need for selling coffee outside of Soppexcca).

In general, the results from the Soppexcca households in cluster 1 showed the limited potential of value chain development to address chronic rural poverty when overall preexisting asset endowments are too low to allow for increased investments in market-oriented activities. Development agencies must learn much more about the dynamics of assets management, or lack thereof, and the related household vulnerabilities as inputs for designing interventions that build the minimum asset base required for effective inclusion in value chains.

Cluster 2: potential revealed for building assets through value chain development

Households in cluster 2 were somewhat more likely to have made important contributions to their natural capital through expansion of landholdings or area under coffee production during the assessment period. Among cluster 2 households, the percent change in total landholdings, at 12.6%, exceeded that for households in clusters 1 (9.7%) and 3 (7.4%). Similarly, the percent change in area under coffee production for cluster 2 households (31%) slightly exceeded that of households from cluster 1 (26.3%) and cluster 3 (27.9%). Overall, limited fertilizer usage by cluster 2 households remained a barrier to improving natural capital: In any given year during the assessment period, roughly between roughly 25% and 50% of these households did not apply a single bag of synthetic fertilizer. That said, households in cluster 2 were nearly twice as likely to have applied fertilizer for coffee production as households in cluster 1, and evidence suggested that overall usage by cluster 2 households was increasing.

Results suggested that many cluster 2 households were low-input producers who struggled to improve their skills and capacities for the application of good coffee production practices during the assessment period. Roughly 32% of cluster 2 households were among those with the lowest coffee productivity (annual production of parchment coffee between 0 and 999 lbs/manzana). Cluster 2 households also suffered considerably more from the effects of anthracnosis in coffee production than households in clusters 1 or 3. However, results also showed the potential that existed among cluster 2 households to adopt new skills for coffee production, since the lion's share (65%) of low-input producers who did implement improved production techniques during the assessment period were in cluster 2. Households in cluster 2 were likely to have acquired or implemented new skills for improving the quality of their coffee, such as improved techniques for harvesting or wet milling.

Overall changes in social capital among cluster 2 households were positive, and, in many cases, significant for increasing the benefits from coffee production. As was the case for cluster 1 households, most cluster 2 households sold their coffee to only one type of coffee buyer prior to joining Soppexcca—usually a local intermediary, and maintained these links after joining Soppexcca. Households from cluster 2 were equally as likely to sell their coffee outside of Soppexcca as households from other clusters, thus reflecting the need to diversify credit sources for meeting acute needs during the year. Most households from cluster 2 did not receive credit for agricultural production prior to the assessment period. During the assessment period roughly 65% of cluster 2 households reported at least one credit source and some 16% reported two sources. Similar to cluster 1, evidence suggested

that cluster 2 households benefited from the socially oriented interventions provided by Soppexcca, including base cooperative organization and assistance with obtaining land titles (Julio Hernandez base cooperative, most of whose members belonged to cluster 2).

Cluster 2 households altogether had mixed results in the building of their physical-capital endowments. The mean total investment in physical infrastructure for coffee production among cluster 2 households was US$822, which was nearly twice that of cluster 1 but roughly half that of cluster 3. However, it is important to note that nearly three-quarters of the cluster 2 households were unable to make any cash investment in physical capital for coffee production during the assessment period. Cluster 2 households invested, on average, US$331 in tools and machinery for agricultural production (tool purchased in addition to those used specifically for coffee production) during the entire assessment period—clearly not enough to achieving meaningful upgrades in technologies for agricultural production. Similar to the experiences in cluster 1, few households from cluster 2 had the resources to improve their housing infrastructure during the assessment period.

Relative to households from the other clusters, Cluster 2 households were more likely to have achieved meaningful increases in income flows through their participation in Soppexcca. Cluster 2 households generally depended less on buyers outside of Soppexcca for the sale of their coffee and for access to credit, thus allowing them to take better advantage of the relatively higher prices offered by Soppexcca. Cluster 2 households generally received about twice the average amount of short-term credit from Soppexcca as households from cluster 1; however, they tended to receive considerably less than households from cluster 3. A similar situation was noted in terms of access to long-term credit for cluster 2 households. However, evidence suggested that cluster 2 households, like their cluster 1 counterparts, struggled to repay long-term credit obligations to Soppexcca, in part due to overall low productivity and major variations in production levels.

In general, the results from cluster 2 households showed the potential of value chain development for building assets among the rural poor. It is argued here that households from this cluster generally had the minimum capital endowments at the beginning of the assessment period, thus allowing them to intensify their coffee production in response to favourable marketing conditions and Soppexcca's technical, financial, and marketing support. However, it can also be argued that most households from cluster 2 have yet to realize their full potential due to limited asset endowments, high risks of coffee production, limited options for on-farm

diversification and off-farm employment, and incomplete service offers among other factors.

Cluster 3: critical for the survival of Soppexcca and the value chain

The total net increase in landholders for cluster 3 households was the smallest of the three clusters. This reflected that a small number of cluster 3 households sold or bequeathed significant extensions of land during the assessment period. On the other hand, households in cluster 3 were much more likely to have purchased relatively large expansions of land (2+mz) during the assessment period. The change in area under coffee production for cluster 3 households was roughly in line with that of households from clusters 1 and 2, indicating perhaps that cluster 3 households often had more diverse agricultural production systems and were more likely to have maintained their coffee plantations during the coffee crisis, and thus generally had less interest in the expansion of coffee during the assessment period. In contrast to households producing conventional coffee from clusters 1 and 2, the majority of cluster 3 households producing conventional coffee applied sufficient amounts of synthetic fertilizer during the assessment period to maintain positive nitrogen balances. These cluster 3 household were also among the most able to implement improved wastewater disposal and harvest practices.

Few cluster 3 households failed to demonstrate the basic skills and capacities for the application of good coffee production practices prior to the assessment period. Only 13% of cluster 3 households were among those households with the lowest coffee productivity (annual production of parchment coffee between 0 and 999 lbs/manzana) over the assessment period, compared to 71% and 31% for households in clusters 1 and 2, respectively. Most cluster 3 households adopted new production techniques for improved quality and environmental performance. While single headed households were relatively common in clusters 1 and 2, representing 24% and 12% of the total cluster membership, respectively, they comprised only 6% of the cluster 3 membership. This structural feature has important implications regarding asset thresholds and asset building, not least of which is an important gender dimension in the design of pro-poor value chain development.

In contrast to households from clusters 1 and 2, which generally relied on only a single buyer (usually a local market buyer) for the marketing of their coffee prior to joining Soppexcca, many households in cluster 3 maintained diversified buyer options for coffee marketing or had access to preferred buyers, such as direct exporters, prior to joining Soppexcca. That said, for most cluster 3 members, relations with Soppexcca offered an additional option for accessing credit for coffee

production and for obtaining a relatively low-risk option for marketing their coffee in the face of unstable international coffee markets. Households from cluster 3 were just as likely to sell their coffee outside of Soppexcca as households from other clusters. This reflected their need to diversify credit sources for meeting production costs throughout the year.

In response to improved credit access and the overall improved marketing conditions for coffee, cluster 3 households altogether showed positive signs of physical capital accumulation during the assessment period. The mean total investment in physical infrastructure for coffee production among cluster 3 households was US$1,502, which was nearly twice that of cluster 2 and four times that of cluster 1. Cluster 3 households that produced conventional coffee invested, on average, US$1,235 in tools and machinery for agricultural production (noncoffee specific) during the entire assessment period—which was three times the average amount invested by similar cluster 2 households and nearly 10 times that invested by similar cluster 1 households. Interestingly, investments in tools and machinery by organic producers in cluster 3 were only half those of their conventional counterparts. Similar to experiences in clusters 1 and 2, most households from cluster 3 had limited resources for investing in new housing infrastructure or improvement to their housing infrastructure during the assessment period.

On average, cluster 3 households that produced conventional and organic coffee received an additional US$341 and US$1,356 per year, respectively, through their participation with Soppexcca. However, overall income benefits were reduced significantly by the need for these households to obtain credit from other sources, and thus diversify their market outlets. While this allowed for increased access to credit and other services, it reduced their overall income benefits, as Soppexcca generally offered higher prices than other local buyers. That said, cluster 3 households tended to receive greater access to Soppexcca-provided credit than households from the other clusters. Cluster 3 households received two to four times the average amount of short-term credit from Soppexcca as households in clusters 1 and 2. A similar situation was noted in terms of access to long-term credit for coffee renovation and the upgrading of physical capital—only for the purchase of land were average credit disbursements between the clusters roughly equal.

In summary, cluster 3 households contributed the lion's share of coffee to Soppexcca but required significant amounts of credit and other Soppexcca services. Without their participation in Soppexcca, the overall business viability of Soppexcca and the value chain as a whole would have been considerably worse. However, the use of limited Soppexcca resources, such as credit and technical assistance, in

cluster 3 came at a high social cost: a more focused effort on building the assets of the asset-poor households in clusters 1 and 2.

8 Toward pro-poor value chain development: Summary, conclusions and recommendations

8.1 Introduction

This thesis began by pointing out the urgent need to understand better the opportunities for poverty reduction and rural development through the support of smallholder agricultural value chain development. The argument hinged on the following three points: 1) the concentration of poverty in the rural sector, with many of the rural poor being smallholder agriculturists, 2) the limitations of previous development approaches to spur rural development, and 3) the renewed interest expressed by donors and NGOs in rural development in general and in VCDA in particular. Despite the growing importance of VCDA for the public and private sectors, however, little information exists on the ability of smallholders and resource-poor enterprises to contribute to and benefit from VCDA.

This research sought to deepen insights into the development of value chains and the related poverty implications. Analysis focused on livelihood asset building at both the level of household and the collective enterprise. The two-level focus took into account 1) the potentially important role of RCEs in facilitating market access and the building of assets by their members and 2) the fact that interventions for value chain development are usually targeted at both households and enterprises. At the enterprise level, data collection considered asset building in response to interventions, services from downstream chain partners, and the overall market context. At the household level, the data collection considered asset building in response to interventions, services from buyers, and the overall market context. The framework was applied to the case of the fair-trade certified coffee cooperative Soppexcca. The assessment period (2004–2005 to 2008–2009) followed a prolonged period of stress related to the coffee crisis, in which many smallholders in Central America reduced their investments in coffee production.

The following section summarises the answers to the three questions that guided this research, followed by a reflection on the larger implications of the findings for agricultural development, in general, and the design of VCDA in particular, including the implications for impact assessment and related learning. The chapter concludes with recommendations for Soppexcca, its supporters, and policy makers in Nicaragua and beyond.

8.2 Summary of responses to research questions

The **first research question** was, How do endowments of productive assets change, either positively or negatively, in response to a given VCDA at the levels of collective enterprise and household?

The **results at the enterprise level** were generally encouraging but did reflect the major challenges faced by Soppexcca to evolve into a self-sustaining enterprise. Within the assessment period, major positive changes were observed in physical capital, mainly in response to investments made possible with income from coffee sales, NGO-provided donations, and access to credit. The use of income from coffee sales for the purchase of the dry-processing plant highlights a dilemma facing RCEs: improved physical capital is one of the few options for improving business viability, but such investments come at the expense of higher prices for members and improved/expanded extension and credit services. Measured and observed changes in social and human capitals revealed mixed results. On one hand, social capital with coffee buyers expanded and deepened during the period in response to Soppexcca's success in debt repayment and its competent professional management. On the other hand, the centralization of decision making in one person and the limited ability to build the capacities of other professional staff, base cooperatives, or members for participation in governance makes Soppexcca and the value chain as a whole vulnerable to collapse. Results for financial capital endowments were also mixed. On the one hand, Soppexcca's ability to offer short-term credit expanded during the assessment period, mainly due to cash injections by NGO-backed projects. On the other hand, member repayment data suggested that recuperation of credit will take longer than expected and no alternative existed to reduce dependence on donor funding for meeting technical assistance expenses (or for expanding credit portfolios).

Results at the household level showed the overall difficulty of households to build assets when their endowments are low, livelihood strategies are diversified, and risks to external shocks are high.

- *Natural capital*: With improved access to credit, some households expanded their total land area and/or expanded/rejuvenated their area under coffee production. Overall investments in improving soil fertility were limited by low financial capital and the high costs of synthetic fertilizers. Where land tenure was extremely insecure (e.g., Julio Hernandez and El Esfuerzo base cooperatives), investments in coffee production were extremely low.
- *Social capital*: Social capital improved across most of the sample with access to new services and reduced risk to unfavourable conditions in international coffee markets. The building of stronger links to Soppexcca

were hindered by limited financial assets (income gaps during the year and limited offer of credit by Soppexcca), as well as the increased price competition (and improved service provision) of local coffee buyers.

- *Human capital*: Results suggested that households faced major challenges in accessing training about good production practices for coffee. Evidence suggested that approximately one-third of the sample practiced no-input/low-input coffee production. A major advancement of human capital was the development of skills for cocoa production; however, relatively few households had the capacity to invest in cocoa.
- *Physical capital*: Advances in physical-capital building were achieved when households had access to long-term credit from Soppexcca. The most common investment was for wet-milling infrastructure, which is important for improving coffee quality. Relatively few investments were reported in tools or machinery for improving the productivity of coffee or other crops, or for adding value to primary production.
- *Financial capital*: For most households, income flows increased only marginally from participation in the value chain of certified coffee. Low productivity was a primary reason. The high percentage of total coffee production sold outside Soppexcca also played a strong role. Many households reported first-time access to short- and long-term credit, but overall credit amounts tended to be too small to allow for major cash investments in asset building. Evidence suggested that the ability to repay credit was limited by low productivity in coffee and high fluctuations in coffee prices.

The **second research question** asked was, What factors facilitated/constrained asset building at the collective enterprise and household levels? **At the enterprise level,** high levels of preexisting human and social capitals played a critical role in asset building. The high levels of human and social capital allowed Soppexcca to obtain funds for its credit and technical assistance program (and thus compete with local traders for their members' coffee), expand its relationships with buyers of certified coffee, and maintain long-term relationships with NGOs and credit providers. The building of Soppexcca's asset base depended on strong interventions by both downstream value chain actors and development NGOs in the development of Soppexcca. The private sector played a crucial role in the initial building of these capitals, while the NGOs, whose support increased significantly during the coffee crisis, provided critical support for building financial and physical capitals.

The following factors **limited asset building at enterprise level** during the assessment period:

- *Disabling local context for business development*: Various events and trends limited the ability of Soppexcca to build assets during the period. The large financial debt inherited by Soppexcca as a precondition for its formation placed a financial strain on the cooperative during most of its existence. The coffee crisis reduced income from the sale of conventional coffee at a time when access to certified markets was limited. With increased access to certified coffee markets came the dramatic increase in local competition for coffee due to higher conventional coffee prices relative to certified coffee prices.
- *Disabling national context for business development*: The near absence of the state in the provision of technical and financial assistance for agricultural production, land-tenure resolution, subsector or value chain development, or improved food security did not facilitate asset building. The government of Nicaragua did not contribute to the development of value chains for specialty coffee, nor has it attempted to play a coordinating role for NGO interventions in the subsector. Deficient rural infrastructure and limited law enforcement existed before and during the assessment period. NGOs partially filled the void left behind by limited government support; however, NGO support was also limited in reach and duration.
- *Delayed learning and innovation*: Evidence suggested that limited learning about options for improving business performance also hindered Soppexcca's ability to build assets. Up-to-date information on coffee-buying relationships and overall financial performance was unavailable to board members. Limited human capital by members constrained their ability to use such information for oversight and strategy building. The development of alternative production technologies and inputs had been carried out through trial and error (e.g., implementation of organic coffee production in the early 2000s). Technical assistance had yet to respond to members' needs.

The **major factor in building assets at the household level** was access to services provided by coffee buyers, mainly Soppexcca. Examples include the increased use of fertilizers (for organically certified and conventional producers), changes in coffee production techniques, expansion of wet-milling infrastructure, and expansion and rejuvenation of coffee plantations. The recent increase in coffee prices most likely contributed to asset building but, in general, coffee production

volumes were too low to have spurred significant levels of asset building. With the exception of local intermediaries, few buyers or organizations provided the services that Soppexcca offered to its members.

The following factors **limited asset building at household level**:

- *Insufficient preexisting assets*: Lack of assets prior to the assessment period limited the building of assets during the period. For a sizable subgroup of sampled households, preexisting endowments were constrained across all five capital assets. Households most likely to have the lowest levels of preexisting endowments were headed by females and faced major land-tenure problems.
- *Incomplete service offer for asset building:* Despite the investments by Soppexcca and others in building the assets of its members, major gaps in assets remained at the end of the period. These gaps tended to be concentrated in human, natural, and financial capitals. Building these assets will require improvements in the design, targeting, and implementation of technical and credit services provided by Soppexcca as well as services for improved food security and the development of other markets for products and services produced by (or potentially produced by) member households.
- *Restricted marketing context*: The overall context for the marketing of agricultural products and services in Nicaragua did not favour asset building. The markets for products other than coffee (e.g., corn, bananas, citrus) provided low returns for on-farm labour but were essential for food security and income generation during the year. It appears that diversification of the agricultural economy to spread and reduce risks may also have had the effect of limiting the potential to scale up a given enterprise. Few households participated in nonagricultural labour markets. Improving the wages in agricultural labour markets through government decree or through certification systems action could benefit the poorest of Soppexcca's members, many of whom depend more on income from other coffee plantations than from their own.
- *Marginalization*: The marginalization of the poor from social, economic, and political processes was evidenced in various ways: the inability of households to obtain titles to their land after years of struggle; the limited influence exercised by members on Soppexcca's governance; and the decisions of development agencies to focus on improved quality rather than on increased productivity and reduced risk. Thus, social and political barriers went hand in hand with economic exclusion.

The **third research question** was, How did differences among rural households in terms of preexisting assets and livelihood strategies impact asset building at the household level? The answer to this question comes from comparison of the household-level results across the three clusters.

Cluster 1 households, which included those households with limited access to land for agricultural production and dependence mainly on off-farm income sources, generally did not have sufficient assets prior to the assessment period to build assets in a significant manner during the assessment period. That said, these households did benefit from participation in the certified-coffee value chain, for example through higher incomes from coffee, access to Soppexcca-provided safety nets, and reduced vulnerability to external shocks (e.g., through access to short-term and emergency credit and the floor price for fair trade coffee). The dependence of these households on off-farm income and their limited ability to intensify their agricultural production (due to their overall limited asset base and the related trade-offs for diversion of these assets to coffee production) meant that they had limited potential to escape poverty through value chain development. Any alternative outcome would require extensive investments by development agencies to build the asset base of the poor as part of the process of linking to a given value chain. The potential for active participation by the private sector in these investments would be limited.

Altogether, evidence suggested that cluster 2 households were more likely to have intensified their coffee production through participation in Soppexcca and the certified coffee value chain. Evidence showed that many of these households built their asset base in terms of natural, social, financial, and physical capitals and, in some cases, human capital through a combination of increased income from coffee and Soppexcca services (mainly short- and long-term credit). However, evidence did not suggest that asset building for cluster 2 households offered sufficiently strong positive feedback loops that would have generated additional asset building and provided a viable pathway out of rural poverty. Major gaps remained—in the services offered by Soppexcca, in complementary assets at the household level, and in the overall business environment in Nicaragua—that effectively prevented the emergence of such feedback loops; for example, the limited ability of households to increase productivity, their high vulnerability to pests and diseases in coffee production (and related lack of risk-reducing options), the limited availability of credit for strategic investments, and the lack of lucrative options for agricultural production outside of coffee. Cluster 2 experiences demonstrated the potential of value chain development to address rural poverty and the need for greater accountability and

learning in order to improve the design of related interventions, as well as the urgency for reforms in the larger business environment.

Evidence suggested that cluster 3 households benefited extensively from access to short- and long-term credit, from Soppexcca-provided technical assistance, and from increased prices for their coffee. These households, both conventional and organic, were critical for Soppexcca's ability to obtain sufficient volumes of coffee to meet contractual agreements with international coffee buyers. However, these households generally sold a significant percentage of their coffee to buyers outside of Soppexcca. Any effort to increase their commitment to deliver coffee to Soppexcca would require significant increases in their access to short-term credit from Soppexcca—which, in turn, would divert resources from Soppexcca's efforts to promote asset building of households in clusters 1 and 2. The relationship between Soppexcca and the cluster 3 households highlights another dilemma for achieving pro-poor value chain development: Soppexcca could increase its long-term viability (and reduce its dependence on NGOs) by dedicating more resources to cluster 3; however, such changes would reduce dramatically its ability to facilitate asset building by those households with more limited asset endowments.

The analysis of asset building by clusters suggests that value chain development can achieve different outcomes, including the building of a sustainable and more competitive value chain, the building of a more viable collective enterprise, and the building of specific assets by the poor. It was shown that all of these outcomes were important to achieving a viable value chain in the speciality coffee subsector that had potential to provide a pathway out of poverty for many of the households linked to it. However, the Soppexcca experience also showed that such achievements did not come cheaply; they resulted from years of investments by coffee buyers, donors and civil society, Soppexcca, and Soppexcca members. In addition, the experiences of households from cluster 1 showed that rural poverty goals might best be achieved by helping those households with the smallest asset endowments to transition out of agriculture. Unfortunately, discussions in the literature on value chains and value chain development have yet to address the complexities, challenges, and dilemmas for achieving poverty reduction through value chain development. Among these dilemmas is the ethics of targeting development efforts toward the not-so-poor, and hence the policies that mediate or encourage the migration of the poorest out of farming and into the nonfarm economy—or even out of rural areas. The Soppexcca case shows the potential that exists for pro-poor value chain development but also the need for deeper discussions about the role of different stakeholders in value chain development, the goals of value chain

development, and the need for increased coordination and mutual learning as part of the development process.

8.3 Contributions of this research

Do VCDA provide a pathway out of poverty for asset-poor households? Can we argue that value chain development has the potential for greater impacts on poverty than earlier approaches, such as nontraditional agricultural export promotion? How can those genuinely interested in poverty reduction achieve greater impacts through value chain approaches? As noted in chapter 2, the literature on value chains and value chain development heretofore has focused limited attention on these questions. The results of the Soppexcca case study shed light on the potential for VCDA to address rural poverty. On one hand, the Soppexcca case has features that facilitate poverty reduction (e.g., long-term donor/NGO support, consolidated preexisting relationships along the value chain). On the other hand, the findings at the enterprise and household levels also reflect the generally unfavourable and high-risk environment for producing and marketing coffee prior to the assessment period (e.g., coffee crisis, Hurricane Mitch). Such caveats aside, the following conceptual and academic advances from the case study can be identified:

- *Role of asset endowments in determining the poverty reduction potential of VCDA*: The ability of value chain approaches to provide a pathway out of poverty depends, in part, on households having sufficient levels of preexisting assets to permit increased investment in asset building. The results of the Soppexcca case study were mixed, with the existence of a relatively large group of households with highly limited asset bases and, hence, little asset building over the assessment period. If these households are to have any hope of pulling themselves out of poverty, interventions for building a minimum asset base among them must be carried out prior to linking them with a given value chain. Efforts must address improving natural and human capitals as a first priority, which, in an initial stage may require targeted subsidies and mechanisms to address production and market risks.
- *Limitations of value chains approaches to address asset building*: Value chain interventions prioritized activities of mutual interest to Soppexcca and its buyers, with a strong focus on quality and environmental stewardship. Results showed the potential for a marked increase in coffee quality and environmental performance at the household level. This may have been necessary but it was not sufficient to provide a path out of poverty for the

asset poor. Results showed that poverty reduction among asset poor must address yield levels, profitability, and efficiency because prices alone for certified coffee cannot compensate for low productivity, limited and low-quality asset endowments, and the related need for risk mitigation. Without understanding and addressing the lack of assets by the poor for effective value chain participation, VCDA run the risk of excluding the poor from the benefits of value chain participation,

- *Critical role of RCEs in asset building*: The Soppexcca case demonstrates the role that RCEs can play in value chain development and in supporting asset building among the poor. Soppexcca offered credit and technical assistance services to its members that proved to be critical for building physical and natural capitals. The overall high level of social capital between Soppexcca and its members facilitated the provision of credit to its members (who otherwise would not have taken credit for fear of loss of land title). While problems existed with technical assistance, it was also clear that for most households Soppexcca was the only source of technical assistance ever received. Improved service provision by Soppexcca to its members will require addressing such problems as high debt levels, improving the effectiveness of technical assistance, and innovation in credit services.
- *Value addition through certification*: Fair trade certification not only ensured access to a premium market but also facilitated access to finance from buyers and specialized lenders, long-term assistance from development agencies, and protection for Soppexcca and its members against future sustained negative price trends in coffee markets. Organic certification provided access to yet higher coffee prices. But these benefits must be traded off against the higher production costs and possible lower short-term productivity. While organic production may seem more environmentally sustainable, productivity may be reduced in the long term if appropriate organic fertilizers are unavailable and soil fertility is compromised, thereby depleting natural assets.
- *Value chain development may not be sufficient for reducing rural poverty:* The thesis shows that market-oriented value chain approaches are important for rural poverty reduction. However, additional development approaches are needed to expand and deepen these contributions. One such approach is a household livelihoods approach. This would orient interventions toward the needs of supplier households as much as toward improved market access and chain efficiencies. Issues such as building

minimum asset endowments, reducing trade-offs between subsistence and value chain activities, and building resilience through safety nets and insurance would take prominence in development interventions. Another approach is a broader subsector approach with public sector support. This would direct interventions toward improved rural infrastructure; improved technical, financial, and business development services; and promotion of markets and related linkages for a range of products and services.

- *Need for better designed and targeted value chain interventions:* Repeatedly this thesis has highlighted the need for faster and deeper learning about the realities of the asset poor and the related implications for the design of services for pro-poor value chain development. Such learning must address critical questions regarding how to facilitate asset building by the poor and by their enterprises over the long-term.
- *Better-defined analytical tools for impact assessment*: Responding to such questions above requires collaboration among enterprises along the value chains, smallholders, and service providers, including NGOs and government agencies. This, in turn, requires that tools be available to facilitate learning by value chain stakeholders. The conceptual and methodological framework presented in this thesis was validated through this case study and 21 other case studies carried out in collaboration with the Ford Foundation. Collectively, the body of research of which this thesis is a part shows that other tools are also required: tools that allow for less expensive, more frequent monitoring of changes; tools that address intra-household issues (e.g., gender equity); and tools that address changes beyond the household and upstream enterprise, for example at the level of a subsector.

Based on the findings from this study, the following recommendations are offered for Soppexcca, NGOs, and businesses interested in supporting Soppexcca and for development agencies in general that are interested in pro-poor value chain development.

Recommendations for Soppexcca

- *Innovation in extension*: The redesign of extension will be critical to lift productivity levels for coffee and demonstrate increased return for donors' investments. Specific elements to be considered include targeting of smallholders based on need and capacity, monitoring of production

systems, and access to subsidies or low-cost credit for households in need of rapid response to production problems. Innovation would also be required in the design of the advance payment and credit programs, including design of an incentive program for compliance with short-term credit terms and the implementation of an easy-access credit program during the harvest period.

- *Empowerment of members and staff to contribute to business operations*: Long-term investments in leadership building, business administration, and conflict resolution will be required for a critical mass of cooperative members with an interest in and the possibility of serving in leadership positions. The extent to which base cooperatives can contribute to reducing costs and improving services must be identified and implemented, including their ability to monitor members' production, provide rapid response to production problems and food insecurity, coordination for input provision (e.g., fertilizers), and coordination/evaluation of technical assistance.
- *Building social and human capitals*: Soppexcca and supporting NGOs have failed to ensure management continuity and succession and member participation. Higher levels of investment in social and human capitals are needed. Building these capitals will require a long-term commitment to building leadership and basic business skills among Soppexcca staff and its membership. It will require the development of mechanisms for conflict resolution and increased transparency.
- *Expanded service offer*: Strengthened relations with members will require that Soppexcca strengthen and diversify its service offer. Extension services must address options for the increased productivity of conventional and organic coffee production. Expanded long-term credit services will be critical for investments in natural and physical capitals. Services, whether provided by Soppexcca or others, must address how to reduce the risks households face, including price and weather-related risks. This also implies that Soppexcca collaborate to increase the effectiveness of donor-funded interventions and provide increased information on related outcomes.

Recommendations for NGOs working with Soppexcca

- *Value chain development from a livelihoods perspective*: External assistance will be required for Soppexcca to improve its capacities to provide better support to its members. This will require innovation and risk taking in the design of extension services and mechanisms for risk reduction in coffee production. In addition, there is need for a multi-chain approach to

address poverty reduction goals. Such an approach accounts for the diversity of coffee-based agroforestry systems and related livelihood strategies. The approach capitalizes on market and business opportunities for secondary agroforestry products, such as timber, fruits, and ornamental plants. This requires a careful mix between an international niche-market orientation for coffee and a focus on local and national, often undifferentiated, markets for secondary agroforestry-system AFS products.

- *Address the needs of the poor for value chain participation*: A major challenge for development agencies is the identification of the asset poor and the provision of services to build their assets *before* linking them to VCDA. In the case of Soppexcca's members, support for building assets for the poorest would include increased productivity in basic grain production; diversification of production in coffee-based agroforestry systems; resolution of major land-tenure issues; and introduction of risk reduction and mitigation measures (food security). In some cases, the use of targeted subsidies for natural capital building (e.g., secure land tenure, soil improvement, rejuvenation) may be the only option for generating positive feedback loops for asset building (where increased natural capital contributes to increased income flows that, over time, leads to increased physical, human, and social capitals). Special attention will be required to increase the asset endowments for value chain participation by households headed by females; human capital, in addition to natural capital, may be especially scarce.
- *Support innovation and learning*: Repeatedly this study highlighted instances where faster and deeper learning by NGOs and Soppexcca would have offered the potential for improving Soppexcca's ability to build its assets and its ability to provide more effective services to rural households. Such learning may not have taken place due to the limited incentives for NGOs to admit failures or limitations in their work (for fear of reducing funding opportunities) and a reluctance to alienate Soppexcca (whose support is required for access to coffee producers). Achieving such learning will require fundamental changes in how interventions are designed, implemented, and assessed, including the need for clear performance incentives at the upstream and household levels.

Beyond the Soppexcca case: Recommendations for those that promote VCDA and that are concerned with poverty reduction

- *Designing pro-poor value chain development interventions*: Where poverty reduction is an explicit goal of an intervention for value chain development, the use of an asset-based approach for intervention design offers critical advantages, in particular the ability to identify those households that require investments in asset building before they can be expected to benefit from their participation in value chains. While such an approach adds complexity to the design and assessment process, the alternative (highly reductionist approach) fails to capture the critical issues related to assets and the overall context that determines, in part, the ability of the poor to benefit from VCDA.
- *VCDA in combination with a livelihoods approach*: The major challenges facing Soppexcca's members are lack of assets, high risks, and incomplete service offer. In the case of Soppexcca, these challenges resulted in low productivity, restricted ability to participate in the value chain, and limited ability to build assets during the assessment period. Understanding these challenges and related opportunities requires the application of a livelihoods approach in connection with the value chain approach. Application of a livelihoods approach will also orientate development interventions toward value chain development for products other than coffee and the design of mechanisms for managing risk. It is argued that the combination of the two approaches provides a useful conceptual basis for addressing rural poverty.
- *VCDA in combination with a subsector approach*: This thesis also highlights the need for development stakeholders to intervene beyond a single value chain in order to achieve increased impact. For Soppexcca, options existed for improving its own dry-processing plant or operating its own extension program. In these cases, benefits may be derived from collaboration with other cooperatives in the purchase and operation of dry-milling services, the training of current and future cooperative leaders, and learning that could improve technical assistance and credit programs. Such collaboration would most likely require a long-term strategy for development of the speciality coffee subsector in Nicaragua. In the absence of state support, this strategy would most likely need to emerge from coordinated efforts by civil society.

8.4 Limitations of research and future research needs

This research stood out from other applications of the asset-building approach by incorporating an upstream enterprise assessment, the deconstruction and specification of livelihood concepts and mechanisms, and the exploration of changes in assets over time. The conceptual approach brought to light concepts that

heretofore had eluded discussions on the impact of value chain approaches, including the existence of asset thresholds; the need for broad-based support from both private and public sectors at enterprise and household levels; the need to target interventions at household asset constraints; and the interrelationships, synergies, and trade-offs related to asset building. The overall methodological approach was endorsed in the context of the international and multiorganizational collaboration for assessing the poverty impacts of VCDA that included 24 case study applications. That said, application of the approach is not for the faint-hearted: it requires asking critical questions about the role of VCDA in building assets and a deep appreciation of the local context, questions, and appreciations for which practitioners have shown limited willingness so far to incorporate into their assessments.

Important issues related to VCDA and asset building merit further research. A better understanding of the trade-offs between subsistence and investments in value chains and options for reducing these trade-offs will be critical for achieving pro-poor value chain development. A better understanding of the options for mitigating the risks of production losses and food insecurity is also urgently needed. The case study highlighted that RCEs and smallholders generally lacked effective services (technical, business development, and financial) for building their asset endowments. However, the literature says little about viable options for improving service quality and coverage in the rural sector or for linking these services so that value chain actors have access to the range of services required for asset building and improved business performance. The analysis of Soppexcca highlighted the dilemmas faced by RCEs in their development pathway and the precarious nature of their existence even after years of buyer and NGO assistance. Identifying viable options for improving the competitiveness of RCEs in less time and with fewer external resources will require new thinking about how to organize RCEs, support them over the long term, and improve the overall business environment in which they operate. Finally, there is need for further work on a theory of change that will relate assets changes to livelihood strategies and outcomes—linkages in the livelihoods framework that are, as yet, poorly understood.

Various limitations existed in the implementation of this research. One was related to the overall complexity in research design and the related challenges in the field. One major operational limitation was the lack of baseline data against which the data could have been plotted, with the aim to identify changes in assets over time. Similarly, the inability to use comparison groups limited the possibility to gain deeper insights into attribution. The only database maintained by Soppexcca was related to credit usage. Nor did projects and other recent interventions by NGOs have baseline

data on Soppexcca's members. The use of comparison groups would have provided deeper insights into causality of the VCDA-related interventions, but during an early stage of fieldwork, it was determined unfeasible to identify a sufficiently large number of smallholders in Jinotega that had not participated in value chains for certified or specialty coffee markets during the assessment period. Had baseline data on asset endowments been available, the accuracy of identifying and attributing changes would have improved, including the possibility to track changes over the assessment period (rather than simply measuring at the beginning and the end of the period). To some extent, these challenges were met with the use of multiple data collection methods and through extensive training and supervision of data collection assistants. However, future research in this area would benefit from increased information from baselines and comparison groups.

Limitations also became evident as related to the conceptual framework. The framework focused on changes in assets, where each asset was analysed in a separate manner. This failed to take into account the role of sequencing in asset building on determining outcomes or the existence of positive (negative) feedback loops and the related driving forces. Increased understanding of the relationship between assets merits attention in future research on asset-building approaches. Another limitation of the framework relates to the enterprise assessment, which applies an asset approach to understand changes in business viability. An asset-building framework may not be best suited for upstream enterprises that are not rural RCEs or do not participate in fair trade markets. For example, analysis of cost structures and competitiveness may better assess business viability than asset endowments do.[63] Also, the methodology will provide insights into how other researchers can operationalise the livelihoods asset framework as a basis for analysing the impact of interventions. But the asset indicators used here are specific to coffee, and other value chains will require other sets of indicators. Fresh produce, staple foods and livestock products can be researched in the same way, but care is required in identifying the critical indicators.

[63] This limitation was brought to light during an international workshop in London (SOAS, April 26–28, 2011) with development practitioners that implemented the framework in the context of collaboration with the Ford Foundation.

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Annex 1 Household level data collection guide

Section 1: Basic information

S1–1 Contact information

Member interviewed:	Sex: M F	Base cooperative:

S1–2 Household members

Member	Age	Last year of education achieved		
		Primary	Secondary	University
Male hh head				
Female hh head				

Household members	Age	Household members	Age
Dependent (M F)		Dependent (M F)	
Dependent (M F)		Dependent (M F)	

Number of hh members five years ago (2004):

S1–3 Membership with Soppexcca
When was the first year that coffee was hold by the household to Soppexcca? _____

Section 2: Natural resource base

S2–1 Coffee production

	2008–2009	2007–208	2006–2007	2005–2006	2004–2005
Total area (mz)					
Productive area					
Production (qq perg.)					

Major fluctuations in production levels

Perceived causes	Yes or no	Details
Fluctuation 1 (from 20__ to 20__)		
Renovation	Y or N	
Organic conversion (or reconversion to conventional)	Y or N	
Climatic event	Y or N	
Major new investment in production	Y or N	
Pests/diseases	Y or N	
Biannual fluctuation in production	Y or N	
Fluctuation 2 (from 20__ to 20__)		
Renovation	Y or N	
Organic conversion (or reconversion to conventional)	Y or N	
Climatic event	Y or N	
Major new investment in production	Y or N	
Pests/diseases	Y or N	
Bi-annual fluctuation in production	Y or N	
Fluctuation 3 (from 20__ to 20__)		
Renovation	Y or N	
Organic conversion (or reconversion to conventional)	Y or N	
Climatic event	Y or N	
Major new investment in production	Y or N	
Pests/diseases	Y or N	
Biannual fluctuation in production	Y or N	

Map of the production area(s) now and five years ago (to be drawn with household members)

Now five years ago (2004)

S2–2 Land acquisition

Total area under production (manzana): _____

# mz	Year obtained	Land use arrangement 1-owner (property title registered) 2-Dueño (property title not registered) 3-Dueño (land reform title) 4-Owner (no title) 5-Occupied	How was the land acquired? 1-Purchase 2-Inheretance 3-Land reform

Describe any conflicts over land access or ownership in the past 10 years

Access to rented and borrowed land

Year	Parcel	Area	Land usage arrangement
2008	Parcel 1		Rented Borrowed 50-50% arrangement
	Parcel 2		Rented Borrowed 50-50% arrangement
2007	Parcel 1		Rented Borrowed 50-50% arrangement
	Parcel 2		Rented Borrowed 50-50% arrangement

S2–3 Actual land usage of own and rented lands

Productive activity	Total area (# head for livestock)	2008 (2007/2008 del café)		2007 (2006/2007 del café)	
		Total production	Household consumption	Total production	Household consumption
Coffee			XXXXX		XXXXX
Beans					
Corn					

S2–4 Land usage in 2004

Productive activity	Total area (# head for livestock)

S2–5 Expansion of productive activities since 2004

New activities or activities in expansion	# manzana (head) expanded	¿Qué hizo posible la inversión? 1-Venta de café 2-Venta de otros productos 3-Ahorros 4Herencia

S2–6 Prácticas actuales de producción (convencional)

General practice	Specific practice	Measure-ment unit	Perceptions of contributing factors 1-Limited outside influence 2-Soppexcca (credit/technical assistance/training) 3-Crédit/technical assistance/training other 4-Subsidies Soppexcca 5-Subsidies other
Solid fertilizers	Compost made onsite	Yes No	
	Other practices (estiércol, pulpa, bocashi)	Yes No	
	Complete fertilizers	qq/mz	
	Urea	qq/mz	
Liquid fertilizers	Biofertilizer	Yes No	
	Liquid fertilizer (Milagro, Baifolan, 20/20)	Sprays/mz	
	Other practices:		
Control of pests and diseases	Graniteo	Yes No	
	Traps	Yes No	
	Herbicide used:	Sprays/mz	
	Endosulfan	Sprays/mz	
	Other practices utilised (biological control):		
Wet milling	Depulping method: dry or wet		
	Uso of pulp:		
	Disposal/usage of waste water from wet milling		
Soil conservation	Practices utilised		

S2–7 Coffee production in 2004 (or before joining Soppexcca, whichever was first)

General practice	Specific practice	Measurement unit
Solid fertilizers	Complete fertilizers	qq/mz
	Urea	qq/mz
	Liquid fertilizer	sprays/mz
Control of pests and diseases	Herbicide used:	sprays/mz
	Endosulfan	sprays/mz
Wet milling	Depulping method: dry or wet	
	Uso of pulp:	
	Disposal/usage of waste water from wet milling	
Soil conservation	Practices utilised	

Section 3: Capacities and capabilities (directed to the female hh head)

S3–1 Participation of women and children in productive activities
In which new productive activities (on-farm and off-farm) has the female hh head participated during the past three years?
What activities were reduced or abandoned as a result?
In which new productive activities (on-farm and off-farm) has the hh dependents (8–15 years old) participated during the past three years?
How as their participation in school-related activities changed as a result?

S3–2 Access to education

Which hh members studied in 2007 or 2008?	Highest year achieved in 2007 or 2008?	What factors contributed to access to education? 1-Increased own income 2-Scholarship 3-Construction of new schools
Age: Sex: M F	Primary: Secondary: University:	
Age: Sex: M F	Primary: Secondary: University:	
Age: Sex: M F	Primary: Secondary: University:	
Age: Sex: M F	Primary: Secondary: University:	

S3–3 Weekly expenses in food products (only for household members, no labour providers)

Food product	Consumption	Perception of change in consumption amount for the household heads now in comparison with five years ago *				
Lbs rice/week		5	4	3	2	1
Lbs sugar/week		5	4	3	2	1
Lbs White cheese during previous month		5	4	3	2	1
Plates served with beef during previous month		5	4	3	2	1
Plates served with chicken during pervious month		5	4	3	2	1

*5=much more, 4=more, 3=same, 2=less, 1=much less

Section 4: Financial matters

S4–1 Sources of income in 2007–2008

Source	Y or N		Contribution to annual gross income*					Source	Y or N		Contribution to annual gross income*				
Coffee	Y	N	5	4	3	2	1	citrus	Y	N	5	4	3	2	1
Beans	Y	N	5	4	3	2	1	remittances	Y	N	5	4	3	2	1
Corn	Y	N	5	4	3	2	1	migration	Y	N	5	4	3	2	1
banana	Y	N	5	4	3	2	1	off farm emp	Y	N	5	4	3	2	1
livestock (L)	Y	N	5	4	3	2	1	microenterprise	Y	N	5	4	3	2	1
livestock (S)	Y	N	5	4	3	2	1	other:_____	Y	N	5	4	3	2	1

*5=very high, 4=high, 3=medium, 2=low, 1=very low

S4–2 Source of income in 2003–2004

Source	Y or N		Contribution to annual gross income*					Source	Y or N		Contribution to annual gross income*				
coffee	Y	N	5	4	3	2	1	citrus	Y	N	5	4	3	2	1
beans	Y	N	5	4	3	2	1	remittances	Y	N	5	4	3	2	1
corn	Y	N	5	4	3	2	1	migration	Y	N	5	4	3	2	1
banana	Y	N	5	4	3	2	1	off-farm emp	Y	N	5	4	3	2	1
livestock (L)	Y	N	5	4	3	2	1	microenterprise	Y	N	5	4	3	2	1
livestock (S)	Y	N	5	4	3	2	1	other:_____	Y	N	5	4	3	2	1

*5=very high, 4=high, 3=medium, 2=low, 1=very low

S4–3 Estimated gross household income in 2008 (2007/2008 coffee production year), based on five most important sources

Income from coffee, banana, off-farm work, and other sources (≥3)	Income
1a) Coffee sold to Soppexcca	sacks: price:
1b) Coffee sold to others	sacks: price:
2) Banana	frequency of sale: avg volume/sale: price of last sale:
3)	Frequency of sale: Average volume/sale: Price of last sale:
4)	frequency of sale: avg volume/sale: price of last sale:
5) Off-farm work	weeks worked: pay per week:

S4–4 Coffee sales outsider of Soppexcca
In 2007, how many sacks of coffee were sold to buyers other than Soppexcca?
What is your primary reason for selling to buyers outsider of Soppexcca?

S4–5 Access to credit (2004–2008)

Short term credit for agricultural production

Provider	# credit disbursements in last five years	Amount of most recent credit	Conditions (interest + collateral)	Factors that facilitated access to credit 1-Soppexcca 2-Project

Long-term credit for production or consumption

Provider	Main usage 1-renovation coffee 2-land purchase 3-home 4-consumption (health care, education, goods)	Total amount	Conditions (interest + collateral)	Factors that facilitated access to credit 1-Soppexcca 2-Project

Does the household have any unpaid credit to Soppexcca or others for loans taken out in the previous three years? With whom? How much? Why?

S4–6 Access to credit before joining Soppexcca

Provider	Use of the credit

Section 5: Relations with buyers

S5–1 Relations with buyers before joining Soppexcca

Before joining Soppexcca, who purchased your coffee?

Local buyers	Yes	no	% (on avg) of coffee purchased: _____
Cooperative	Yes	no	% (on avg) of coffee purchased: _____
Exporter	Yes	no	% (on avg) of coffee purchased: _____
Otros: _____			% (on avg) of coffee purchased: _____

What services were provided by these buyers?

Local buyer			Cooperative			Exporter		
Transport	si	no	Transport	si	no	Transport	si	no
Credit	si	no	Credit	si	no	Credit	si	no
Inputs	si	no	Inputs	si	no	Inputs	si	no
$ /delivery	si	no	$ /delivery	si	no	$ /delivery	si	no
Tech assist	si	no	Tech assist	si	no	Tech assist	si	no

S5–2 Utilization of services provided by Soppexcca

Service	2007	2008	Level of satisfaction*				
# visits by Soppexcca extension staff (where technical assistance was provided)			5	4	3	2	1
# of training events in which hh members participated			5	4	3	2	1

*5=very high, 4=high, 3=medium, 2=low, 1=very low

In general, how has your capacity changed to respond to the recommendations of Soppexcca extensionists?

Very high high medium low very low

Why?

S5–3 Difficulties with services received for the production and marketing of coffee

Difficulties encountered during the past two years (2007-2008)	Details
Access to credit	
Amount of credit	
Delivery of credit	
Delivery of fertilizer	
Technical assistance	
Payment for coffee delivered	
Transport of coffee and inputs	
Rejection of coffee	
Rented services for depulping and wet milling	

S5–4 Other services received for agricultural production during the past five years

Project or organization	Services received	Period services received	Level of satisfaction with services *				
			5	4	3	2	1
			5	4	3	2	1

*5=very high, 4=high, 3=medium, 2=low, 1=very low

Section 6: Machinary, equipment, and tools

S6–1 Ownership of machinery, equipment, and tools agricultural production (2005–2008)

Machinery, equipment, and tools	Number	Year purchased	Cost	Most important factor in acquisition 1-project 2-credit Soppexcca 3-credit other 4-sale of coffee 5-sale of other product/service 6-inheritance
depulper				
water pump				
wet mill				
motor bump				
grain silo				
chain saw				
truck				
mower / chopper				
beasts				

Section 7: Household consumption patterns

S7–1 Improvements in housing infrastructure

Housing component	Now	Four years ago (2005)	Renovation of existing material	Amount invested	Most important factor in acquisition 1-project 2-credit Soppexcca 3-credit other 4-sale of coffee 5-sale of other product/service 6-inheritance
Roof	zinc plastic tile	zinc plastic tile	yes no		
Floor	wood cement earth	wood cement earth	yes no		
Walls	wood cement zinc adobe	wood cement zinc adobe	yes no		
Solar panel	yes no	yes no	yes no		
Generator	yes no	yes no	yes no		
Construction of home	yes no	yes no	yes no		
Construction of shop or other structure	yes no	yes no	yes no		

S7–2 Ownership of consumer goods

Good	Purchase in the last four years	Amount invested	Most important factor in acquisition 1-project 2-credit Soppexcca 3-credit other 4-sale of coffee 5-sale of other product/service 6-inheritance
Cellular phone/phone	yes no		
Bike	yes no		
Moto	yes no		
Auto/truck	yes no		
Sewing machine	yes no		
Refrigerator	yes no		
Stove	yes no		
Audio equipment	yes no		
TV/DVD	yes no		
Second home	yes no		
Furniture	yes no		
House appliances	yes no		

¿During the past four years, have you had to sell land, home or other important possession?

Good sold	Year	Reason

Section 8: General evaluation

How satisfied are you with your affiliation with Soppexcca? very high high medium low very low Why?

Annex 2 Technical aspects of smallholder coffee production

Good practices in coffee production include regular and sustained fertilization during the various stages of coffee tree development, soil and plant protection (weed control, ground cover, shade tree management, windbreaks), regular pruning, and timely rejuvenation. Pruning and rejuvenation take into account that after a certain period of continuous production, coffee branches become less protective or unproductive. Therefore, they need to be cut down and replaced by young ones. Pruning should be done every year after harvesting period. Pruning achieves the following results: 1) maintains the morphology and balance of the coffee tree to facilitate harvesting, 2) eliminates unproductive branches and suckers, 3) encourages growth of new stems and fruit-bearing branches, 4) ensures correct ventilation and allows sunlight to penetrate throughout the tree (thus reducing the impact of pests and disease and encouraging floral induction), 5) avoids overproduction, and 6) reduces biennial bearing (see Snoeck and Lambot 2006 for more details). Rejuvenation aims to sustain "normal" yields over time by renewing the fruit yielding branches of the coffee tree. The renewal of exhausted vertical stems with new shoots growing from the stump enables production to return to normal levels. This also avoids harvesting difficulties due to the height of the stems. After cutting back the old stems, shoots develop at the base of the coffee tree and, after selection, the healthiest and better-placed shoots become the replacement stems (ibid.). This deprives producers of any return on coffee for one or two consecutive years.

Coffee plants need the major nutrients nitrogen (N), phosphorus (P) and potassium (K), as well as minor nutrients. The amount of fertilization required depends on soil quality and the quantity of nutrients removed each year as coffee beans. Van der Vossen (2005) estimates that in shade coffee production 53 kg, 85, kg, and 150 kg of nitrogen and roughly equal amounts of potassium must be applied per hectare to correct the nutrient balance of farms with per hectare coffee production of 500kg, 1,500kg, and 2,000 kg, respectively. These calculations, however, assume that the coffee pulp is not recycled but taken away from the farm with the coffee beans. Roughly one-third of the nutrients removed as coffee berries can be returned to the farm by carefully recycling the coffee pulp, the nutrient-rich outer layer of the coffee fruit. In Nicaragua, this can be done relatively easily because coffee berries are usually depulped on-site instead of being transported far away for processing. When coffee pulp is recycled, 27–60 kg of nitrogen per manzana (36–80 kg/ha) need

to be supplied from outside the coffee field to replace the nutrients removed with shade coffee production of 500–2,000 kg per ha (Valkila 2009). Thus, a rough estimate can be made that in order to keep coffee yields at a reasonable level and to maintain soil fertility, a minimum of 27 kg of nitrogen per manzana (36 kg/ha) need to be supplied annually in addition to recycling coffee pulp and using nitrogen-fixing shade trees (ibid.). To reach a given level of nitrogen, greater quantities of organic fertilizers are required. For example, to obtain 27 kg of nitrogen, 58 kg of urea (46% N) would be required, or 180 kg of complete fertilizer 15-15-15 (15% N) or approximately 1,350 kg of either *bocachi* (about 2% N), compost (about 2% N) or Biogreen (about 2% N) (ibid.).

There are two basic options available to coffee producers for fertilization: inorganic fertilization and organic fertilization. The two most common inorganic fertilization options are urea and complete fertilizer. For households producing conventional coffee, inorganic fertilizers provide a relatively cheap and effective source of nutrients. Conventional producers may also use some forms of organic fertilizers. Organic fertilizers, such as compost and recycled coffee pulp, can have benefits in addition to improved plant nutrition. They can increase soil organic matter, water infiltration and water-holding capacity. It is common that coffee production by smallholders in Nicaragua be carried out under shade. Shade tree litter provides an additional source of organic matter. In both conventional and organic coffee production, part of the nitrogen needed can be provided by nitrogen-fixing shade trees. Although all of the observed organic coffee producers had nitrogen-fixing shade trees on their farms, farmers with higher yields also applied additional organic fertilizers. Organic materials commonly used for fertilization in Nicaragua include:

- Coffee pulp: Approximately 40% of the wet weight of the nutrient-rich coffee fruit is in the form of coffee pulp, which is removed and usually discarded as waste by conventional coffee farmers (Sanchez et al. 1999). Pulp is typically left to degrade in piles without any treatment, causing odours and nutrient-loaded leaches. Composting the pulp produces a high-quality fertilizer. It is estimated that 45 kg of dried coffee pulp are equivalent, on the basis of its chemical composition, to 4.5 kg of an inorganic fertilizer 14-3-37 or to 9 kg of 7-1.5-18.5 (de Castro 1960) This reflects the high potassium content of coffee pulp. The organic matter of coffee pulp contains more nitrogen and potassium than other common fertilizers, and experiments have indicated that coffee pulp is a valuable fertilizer particularly for coffee (Brezan 1979).
- Cattle manure: The nutrient content of cattle manure varies, but a rough estimate is that cattle manure contains 0.7% N, 0.2% P and 0.7% K (Ghosh

et al. 2004). In Nicaragua, there are areas where both cattle and coffee production are common, providing some opportunities for coffee farmers to utilize manure originating near their farm. However, the ability of producers to supply significant amount of nutrients from manure may be limited, as the amounts required are large given the relatively low intensity of cattle farming carried out in northern Nicaragua. Transportation costs may prohibit the use of cattle manure from other regions where cattle ranching is more extensive.

- *Bocachi* and compost: *Bocachi* is a type of compost with recommendations on the mix of materials to be used. *Bocachi* may contain coffee pulp, household organic waste, cattle or poultry manure, ashes, molasses, yeast, stems from bean production and other organic waste. When the mix is simpler, e.g., contains only coffee pulp, cattle manure and bean stems, it is commonly known as compost. The nitrogen content of compost is likely to vary between 1% and 3%, depending on the amount of nutrient-rich components, such as coffee pulp and chicken manure, in the mixture and how well composting is carried out. It is recommended that 3–10 kg of compost be applied to each tree per year or every other year (Sosa, Escamilla, and Díaz 2004). (Most households reported about 4,000 coffee plants per manzana). This would amount to between 8,000 and 40,000 kg of compost per year for each manzana under coffee production. The production of compost and *bocachi* has been heavily promoted by Soppexcca through technical assistance and training. During the early years of organic production, compost and *bocachi* was the main option available for the fertilization of organic coffee plantations.
- Chicken manure-based solid fertilizer (Biogreen): Biogreen is the trademark of the first commercially available, poultry-manure-based organic fertilizer to be sold in Nicaragua. It originates from the largest chicken farm in Nicaragua. This factory farm has approximately 300,000 hens and its main product is eggs. All of the manure-based fertilizer produced by this poultry farm is bought by organic coffee producers in Nicaragua. Soppexcca purchases Biogreen in bulk and distributes it to households producing organic certified coffee. Concern has been raised regarding the use of Biogreen as it involves transportation of fertilizers over long distances and uses manure that is generated from a factory farm. The use of Biogreen for certified organic coffee production is currently approved by one of the two major organic certifying agencies in Nicaragua, Biolatina, but not approved by the other agency, OCIA.